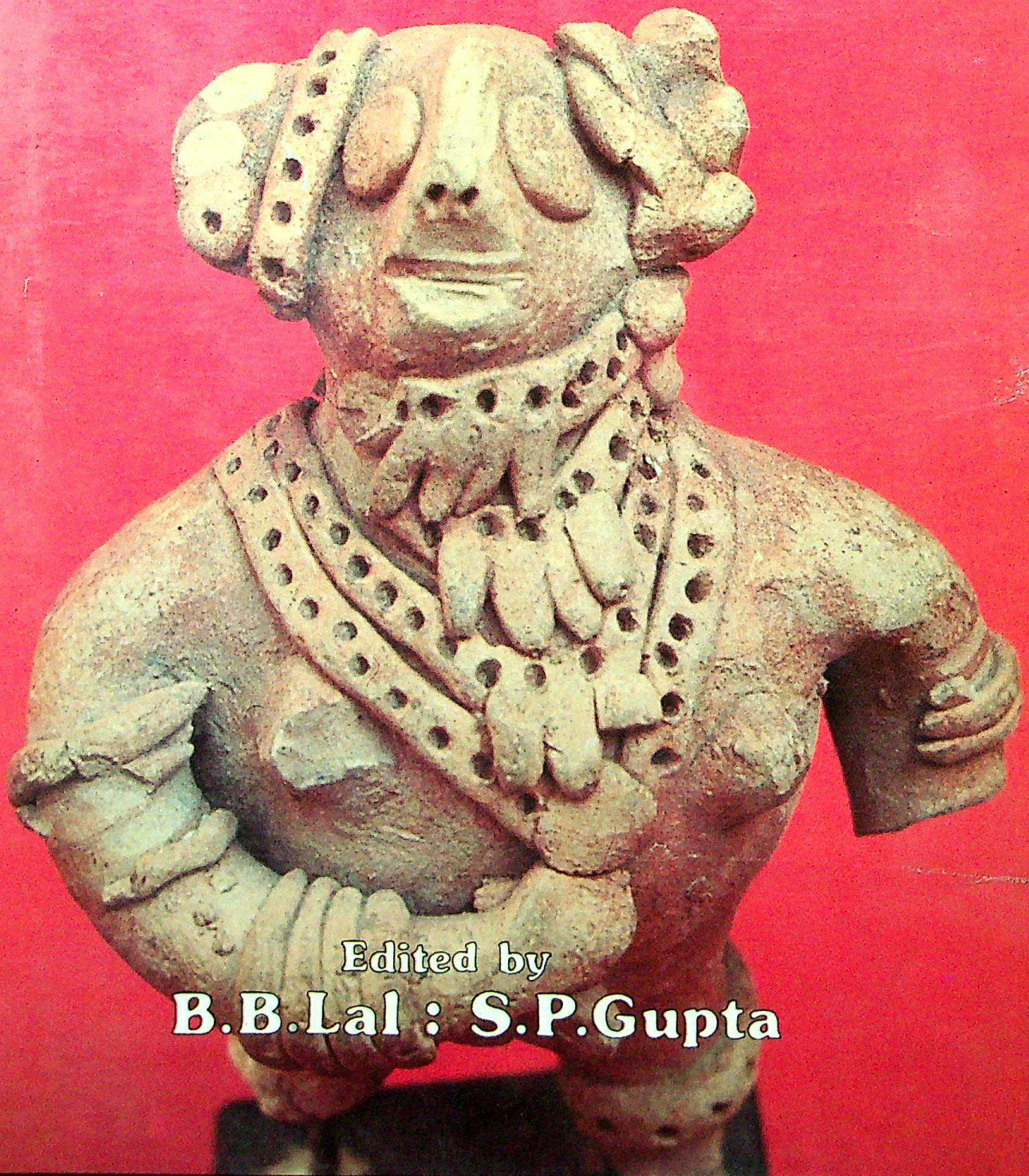
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FRONTIERS OF THE INDUS CIVILIZATION



Edited by

B.B.Lal : S.P.Gupta

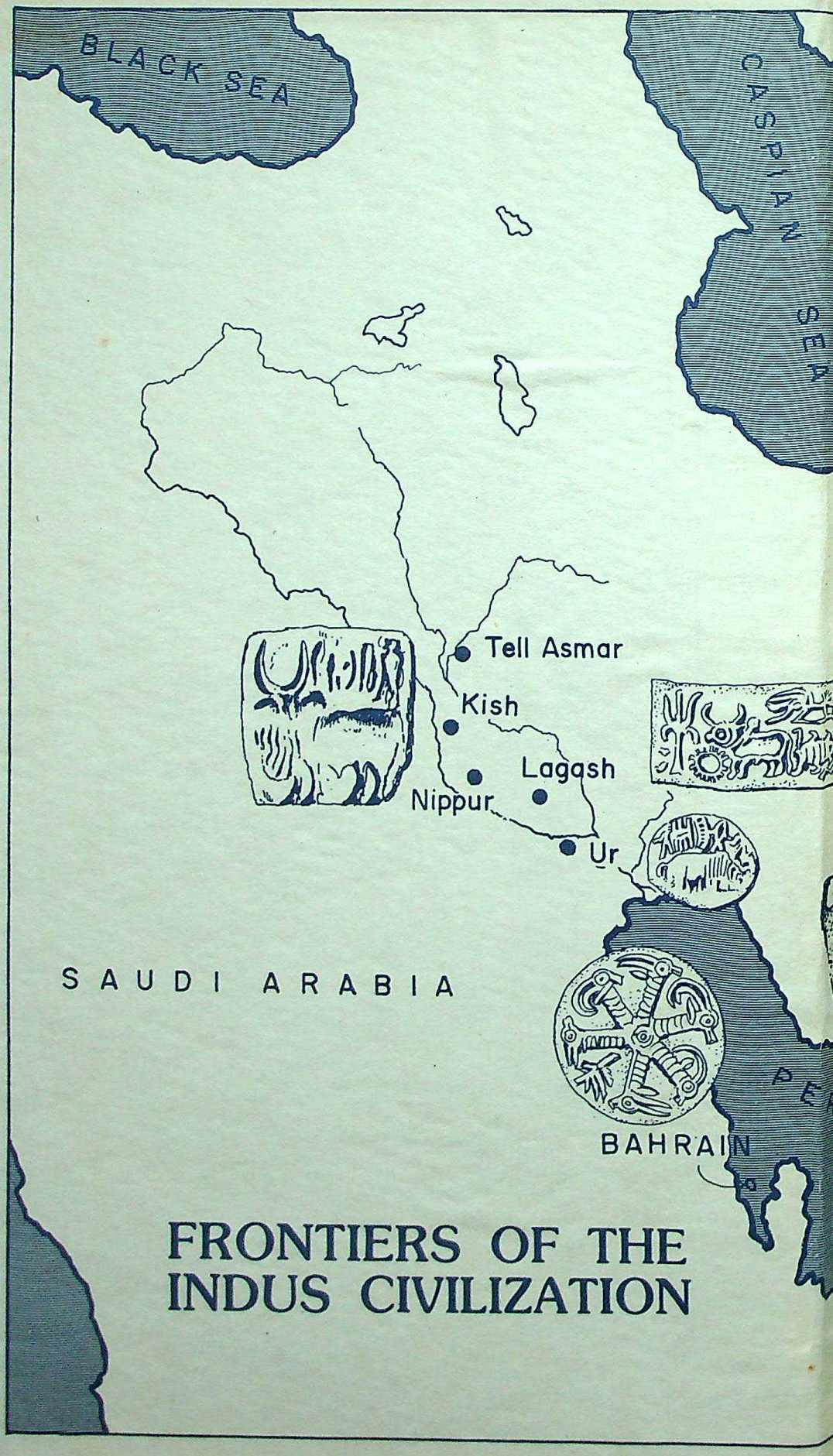
SIR MORTIMER WHEELER COMMEMORATION VOLUME

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FRONTIERS OF THE INDUS CIVILIZATION

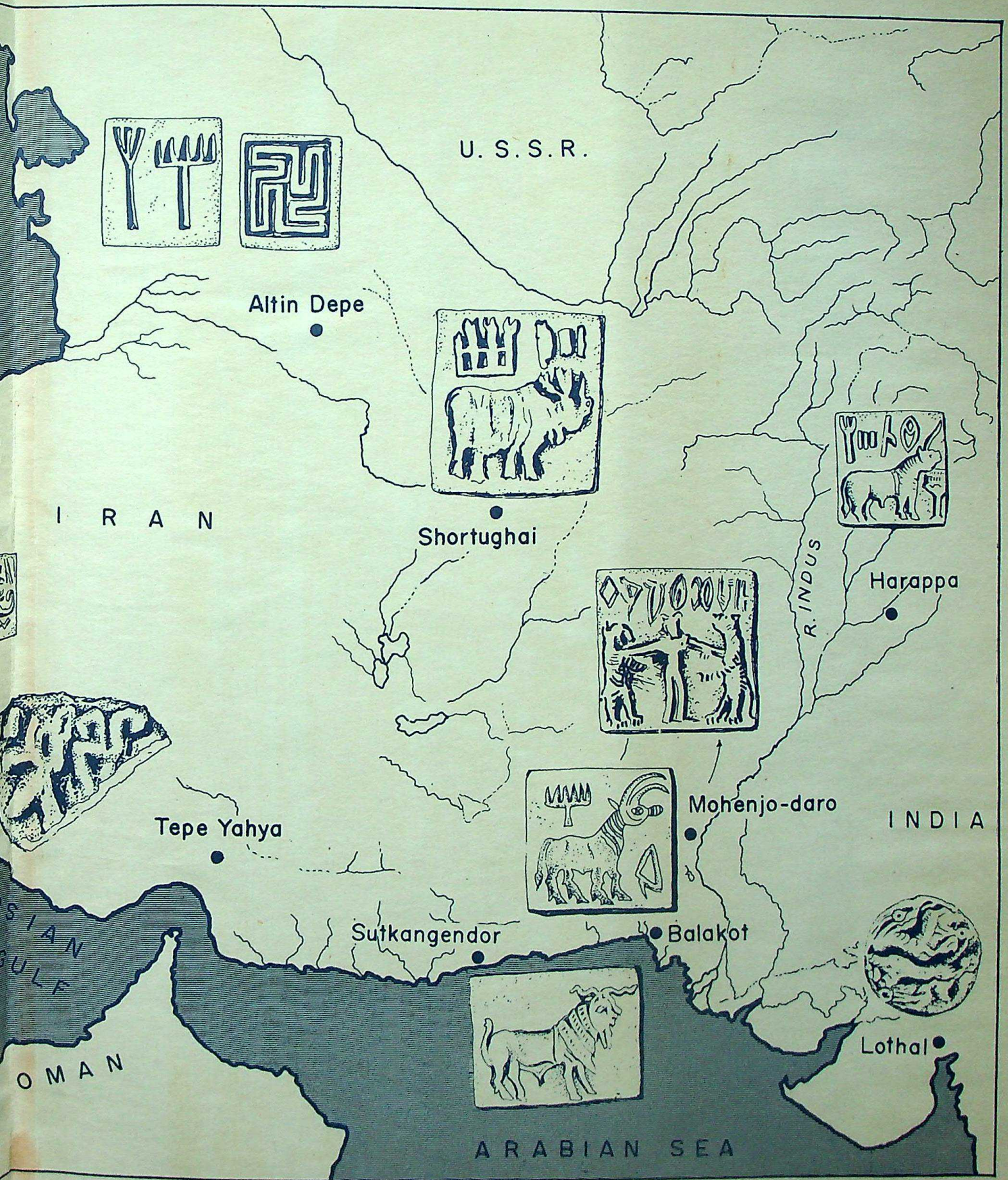
Edited by
B.B. Lal : S.P. Gupta

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



FRONTIERS OF THE INDUS CIVILIZATION

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

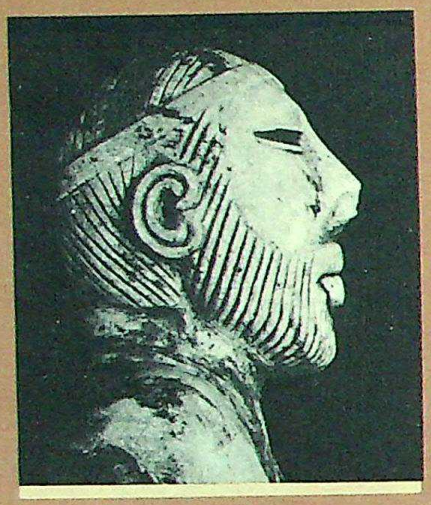


CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ROBERT ERIC MORTIMER WHEELER 1890 – 1976

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



FRON
OF THE
CIVILI

Published by Books & Books on behalf of Indian Archaeological Society jointly with Indian History & Culture Society

SIR MORTIMER WHEELER
COMMEMORATION VOLUME

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

TIERS
E INDUS
ZATION

Chief Editors
B.B. Lal: S.P. Gupta

Asstt. Editor
Shashi Asthana

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

© Indian Archaeological Society

Book No 78

Price: Rs. 800/-
Rs. 900/- Deluxe Edition

ISBN 0-85672 231 6

Published by I.M. Sharma of Books & Books, C4A/20A, Janakpuri,
New Delhi-110058 on behalf of INDIAN ARCHAEOLOGICAL SOCIETY
jointly with INDIAN HISTORY & CULTURE SOCIETY.

Phototypeset by The Word, 807, Nehru Place, New Delhi

Text and title printed by Grafikindia, N-11, Greater Kailash Market-I New Delhi.

Plates printed by Gay Printers Panchkuian Road, New Delhi.

1984

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Contents

PREFACE
ACKNOWLEDGEMENTS
INTRODUCTION
AUTHORS xv
LIST OF ARTICLES

1. **B.K. Thapar** Six Decades of the Indus Studies 1
2. **Gregory L. Possehl** Archaeological Terminology and the Harappan Civilization 27
3. **Masatoshi A. Konishi** 'Pre'-or 'Early' Harappan Culture: A Conceptual Battle 37
4. **Dilip K. Chakrabarti** Origin of the Indus Civilization: Theories and Problem 43
5. **F.R. Allchin** The Northern Limits of the Harappan Culture Zone 51
6. **B.B. Lal** Some Reflections on the Structural Remains at Kalibangan 55
7. **Arun Kesarwani** Harappan Gateways: A Functional Reassessment 63
8. **M. Jansen** Architectural Remains in Mohenjo-daro 75
9. **R.S. Bisht** Structural Remains and Town-planning of Banawali 89
10. **Marcia Fentress** Time and Process at Harappa and Mohenjo-daro 99
11. **B.M. Pande** Harappan Art: An Experiment in Third Dimension 105
12. **George F. Dales** Sex and Stone at Mohenjo-daro 109
13. **Jonathan M. Kenoyer** Chipped Stone Tools from Mohenjo-daro 117
14. **R.H. Meadow** A Camel Skeleton from Mohenjo-daro 137
15. **V.B. Mainkar** Metrology in the Indus Civilization 141
16. **Brij Bhushan Vij** Linear Standard in the Indus Civilization 153
17. **R.C. Agrawala** Aravalli, the Major Source of Copper for the Indus and Indus-related Cultures 157
18. **D.P. Agrawal** Metal Technology of the Harappans 163
19. **Yu. Knorozov, B. Volchok and N. Gurov** Some Groups of Proto-religious Inscriptions of the Harappans 169
20. **J.V. Kinnier Wilson** The Case for Accountancy 173
21. **Asko Parpola** Interpreting the Indus Script 179
22. **S.R. Rao** New Light on Indus Script and Language 193
23. **S.C. Malik** Harappan Social and Political Life 201
24. **Y.M. Chitalwala** The Problem of Class Structure in the Indus Civilization 211
25. **K.V. Soundara Rajan** · Kutch Harappan—A Corridor of the Indus Phase 217
26. **R.N. Mehta** Valabhi—A Station of Harappan Cattle-breeders 227
27. **K.N. Momin** Village Harappans in Kheda District of Gujarat 231
28. **S.A. Sali** Late Harappan Settlement at Daimabad 235

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

29. **M.K. Dhavalikar** Sub-Indus cultures of Central and Western India 243
30. **K.N. Dikshit** Late Harappa in Northern India 253
31. **Giorgio Stacul** Harappan Post-urban Evidence in the Swat Valley 271
32. **Walter A. Fairservis** Archaeology in Baluchistan and the Harappan Problem 277
33. **Jean Francois Jarriage** Towns and Villages of Hill and Plain 289
34. **H.P. Francfort** The Harappan Settlement of Shortughai 301
35. **J.C. Gardin** Canal Irrigation in Bronze Age Eastern Bactria 311
36. **Philip Kohl** Prehistoric 'Turan' and Southern Turkmenia: the Problem of Cultural Diversity 321
37. **Denis L. Heskel** Iran-Indus Valley Connections: A Revaluation 333
38. **C.C. Lamberg-Karlovsky** An Idea or Pot-Luck 347
39. **Shashi Asthana** The Place of Shahdad in Indus-Iranian Trade 353
40. **During Caspers:** Sumerian in Harappan Society. 363
41. **Cleuziou Serge** Oman Peninsula and its relations Eastward during Third Millennium 371
42. **Sheila Weiner** Hypotheses regarding the Development and Chronology of the Art of the Indus Valley Civilization 395
43. **S.P. Gupta** Internal Trade of the Harappans 417
44. **K.A.R. Kennedy** Trauma and Disease in the Ancient Harappans 425
45. **K.M. Srivastava** The Myth of Aryan Invasion of Harappan Towns 437
46. **Bridget Allchin** The Harappan Environment 445
47. **R.L. Raikes** Mohenjo-daro Environment 455
48. **V.N. Misra** Climate, a Factor in the Rise and Fall of the Indus Civilization—Evidence from Rajasthan and Beyond 461
49. **Yash Pal, Baldev Sahai, R.K. Sood and D.P. Agrawal** Remote Sensing of the 'Lost' Sarasvati River 491
50. **M.R. Mughal** The Post-Harappan Phase in Bahawalpur distt., Pakistan 499
51. **F.A. Durrani** Some Early Harappan Sites in Gomal and Bannu Villages 505
52. **J.P. Joshi, Madhu Bala, Jassu Ram** The Indus Civilization: A Reconsideration on the Basis of Distribution Maps 511
53. **K.N. Dikshit** The Sothi Complex: Old Records and Fresh Observations 531

Appendices

I. **K.S. Ramachandran** Dating the Indus Civilization 538
II. **H.D. Sankalia** Expectations from the Excavation of a New Site of the Indus Civilization 539

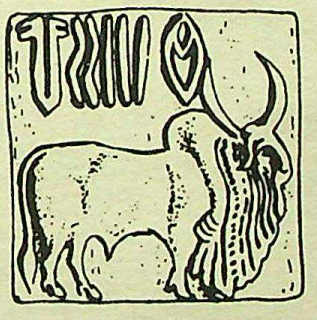
LIST OF PLATES 541

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

PREFACE

'Better late than never' is all that we can say while presenting this volume to the readers. Way back in 1973, one of the editors (S.P. Gupta) had planned to bring out a comprehensive book on the Indus Civilization. He had also asked the other editor to lend his hand, which he willingly did. The caption of the book was to be 'Fifty Years of Harapan Studies', and it was planned to felicitate Sir Mortimer Wheeler. All those, in India and abroad, who had worked on the Indus Civilization and allied topics were requested to contribute articles. However, for reasons best known to them (indeed, it would be in bad taste to offer any comments), members of the very organization which Sir Mortimer nourished for full four years between 1944 and 1948, declined to cooperate. Even personal entreaties to individuals were of no avail, and it became clear that the book was doomed. Meanwhile, the inevitable happened and destiny snatched Sir Mortimer from among our midst. In spite of these odds, the editors decided to go ahead with the publication of the volume even if it fell far short of the originally envisaged coverage. Thereupon (in 1980), some of the members of the Survey also resiled and gave their papers. Thus, whatever papers have been received are included in this volume and it is felt that, though attenuated, it does throw some valuable light on various important aspects of the Indus Civilization.

The editors are most grateful to all the authors, and in particular to those who have borne with them all these dismal years.



ACKNOWLEDGEMENTS

In this work we have received help from various friends and colleagues to whom we offer our sincerest thanks. The notable amongst them are Smt. Anita Sarkar, Sarvashri S. Ganesh Rao, C.B. Trivedi and Pramod Trivedi for checking the proofs, to Shri. Lalit Jain for the lay-out of the plates and designing the jacket of the book, to Shri. Nematullah Shah for making the colour transparencies of the front jacket, and to Dr. M. Jansen for giving us the colour print of the baloon photograph of the Great Bath of Mohenjo-daro for the back jacket. We are also beholden to Sarvashri Vinay Aditya of 'The Word Phototypesetters', Shri. Amrit Sharma and his associates of Grafik-india, Shri. Brij Mohan of Gay Printers, Shri. I.M. Sharma of the Books & Books for pooling their technical resources in bringing out this volume. At the end we thank Mrs. Kiran Tandon and S. Ganesh Rao for the professional editing of the manuscript.

B.B.Lal
S.P. Gupta

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Introduction

Most of us live just to die. But there are a few who die and yet live — live in the minds of those whom they inspired and influenced. The late Sir Mortimer was indeed one such.

Behind a gruff exterior, Sir Mortimer had a very kind and sympathetic heart. It is rarely that his anger and shouting were meant to harm a person.

'Bring that back', said Sir Mortimer to me, 'I will tell you what to do with it.' This was in his office-room in the Curzon Road Barracks, New Delhi, in 1947. Tears were trickling down my cheeks, for the task-master had unceremoniously thrown away the ten-page draft of a report I had prepared on a section of finds from the 1946 excavation at Harappa. To the best of my knowledge, there was no factual error in the text and perhaps very little, if any, of language. An 'officer' should not have been humiliated like that, I felt. However, having been so directed, I collected the sheets strewn on the floor and placed them before the boss.

'My dear boy, you must write always keeping in mind that each word is going to cost you a pound for printing. If you do this, you will learn to be precise and straightforward.'

My padded draft of ten pages was slashed down by Sir Mortimer to a little over four pages and there was no omission of anything that mattered. Even today I feel sorry that I did not have enough training under him in so far as the preparation of reports is concerned.

Sir Mortimer did not spare even his English colleagues in this regard. I distinctly remember his asking one such colleague in the Archaeological Survey, during their first encounter in India: 'Hullo, Mr. so and so, have you improved your English.' The answer was downcast eyes and a faked smile.

To Sir Mortimer, sweating with the pen and sweating on the field were equally important. And in this he would not spare anybody, be it even his wife. The scene was laid at Harappa. It was June 1946. The mercury had gone beyond 118°F. In the afternoon we were working at our respective trenches. Lady Wheeler was given the assignment of drawing the plan and section of a circular brick-platform which had especially been excavated to find out its probable function. I was in over all charge of this and another adjoining area and was, therefore, supposed to oversee the work of Lady Wheeler.

Harappa, like the rest of the Punjab, experiences heavy dust-storms during the summer and one such storm occurred that evening. It was blinding. The visibility was hardly a couple of yards. The poor lady could not proceed with her drawings and sat down in a sheltered corner of the trench. Suddenly we heard the roar of the moustached man-lion. He was shouting at his wife for not having completed the drawing as per schedule. When I tried to intervene, pleading that the delay was on account of the bad weather, I was given the rebuff: 'It is your own weather. I have not brought it from England. If I can work in it, why can't you people?'

If once it got into Sir Mortimer's head that a thing ought to be done, he always found ways and means to do it, whatever the obstructions. It was a hot summer morning in 1945. I had finished my studentship-training in field-archaeology under Sir Mortimer during the camps at Taxila and Arikamedu, and was staying at the K.P.U.C. hostel at Allahabad to prepare myself for an interview for the post of Assistant Superintendent in the Survey. The advertisement inviting applications was expected any moment. And there it was in the newspapers that morning. I saw it with startled eyes. The minimum age-limit was twenty-five years, whereas I was just twenty-three. Greatly irritated, and in a violent mood, I wrote to Sir Mortimer:

> I am sure you must have seen the advertisement inviting applications for the posts of Assistant Superintendents. The lower age-limit is twenty-five, whereas I am only twenty-three. Evidently, therefore, I cannot apply for the post. I must, however, say that you have wasted your time and my time, your energy and my energy, in training me up. But before I lay down my arms, I would like you to answer a simple question: Do you think I will put more brains in myself after two years?

Back came a telegram from Bombay where he had gone on tour: 'Suggest apply irrespective of age.' I am told that, on return to Simla, the then

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

headquarters of the Survey, he trunk-called the Secretary, Ministry of Education, Health and Land (as it was then called) to apprise him of the problem. The Secretary, as was to be expected, pointed out the rules once again. Thereupon, I am further told, Sir Mortimer got somewhat ruffled and stressed that he had specially been invited by the Viceroy to set the Survey right and if he did not get the right men he had better leave. The threat worked and there came the relaxation. Rules are a help to rule and not to be ruled by, Sir Mortimer always believed.

Though he ruled with an iron hand, in academic matters he always gave his opponents their due. One evening in 1944 when the day's work was over at the Bhir Mound (Taxila) and I was returning home, I happened to see Sir Mortimer still busy down in a trench, drawing its section. He was scraping and re-scraping the section and had put down on the drawing sheet the lines of some layers. Although my training in 'layerology', as we loosely used to call it, was only a fortnight old, I dared pronounce from the trench-top.

'Sir, you seem to be wrong ' 'What nonsense', came the reply from the deep trench. 'Shall I come down and discuss it?' So saying I went down the ladder and tried to show to the *guru* where he was wrong. It was the case of a huge chunk of earth which had been thrown up *en bloc* from a nearby well-pit,the chunk still retaining its original layers, *i.e.* without merging with the new ones on the edge of the pit. Sir Mortimer did not seem to agree with my explanation. Anyway, we broke off for the night.

Next morning, within minutes of our starting work, he came to my trench; 'My boy, you were right'.

During the same excavation season, we had another heated discussion.This time it related to the interrelationship of two structures. The stratigraphy had partly been disturbed. Sir Mortimer was of the view that Structure X was earlier than Structure Y, whereas I held that it was the other way round. Since the stratigraphy was not very clear, Sir Mortimer did not like to swear by what he said, and yet he thought he was right. Thereupon I demonstrated it to him, following the superimposition of the stones, that really it was Y and not X that was earlier. Sir Mortimer readily accepted my explanation.

And mark you, the greatness of the man. After a quarter of a century, he referred to these Taxila anecdotes in his speech at the time of introducing me to the learned audience at the School of Oriental and African Studies, London where I delivered the Gandhi Memorial Lecture in 1971.

I normally avoid reviewing books, but when the editor of *Antiquity* insisted on my reviewing Sir Mortimer's *Early India and Pakistan*, I had no option. My review (*Antiquity*, XXXIV, 224-27) was nothing but scathing. I took Sir Mortimer to task for a number of statements, for example those relating to the date of the N.B.P. Ware at Taxila, the movement of the Megalithic folk, and, above all, his pet theory that 'Ashoka may have had Seleucid blood in his veins'. Instead of getting irritated over the review, he immediately wrote to me:

My dear Lal, I have just seen in *Antiquity* your review of my book. I am glad that I have lived long enough to see my student reviewing my work.

Sir Mortimer's affection for me did not decrease in any way on account of this dreadful review. If anything, it increased.

Old age never daunted Sir Mortimer. In fact, he hated being called 'old'. In 1961, on the occasion of the Centenary Celeberations of the Archaeological Survey of India, I had the privilege of inviting him, along with Sir Max and Lady Mallowan, Professor F.E. Zeuner and Professor Robert J. Braidwood to a private dinner at my New Delhi residence. Present at the party were also a few Indian friends who were not archaeologists. I introduced Sir Mortimer to them and added that, 'even at this age he climbs not one but two steps at a time.' Sir Mortimer resented my remark and, winking at Lady Mallowan (Agatha Christie), he asked her if she thought he was 'old'.

His *Still Digging* reflects the same attitude. The fact that he continued to write till his very end shows that work was worship to him. In fact, he preferred work to worship: it was with the greatest reluctance that he gave me half-day leave at Arikamedu (1945) when I wanted to have a *darshana* of Shri Aurobindo at his *Ashrama* in nearby Pondicherry.

INTRODUCTION

Full sixty years have elapsed since the discovery of the remains of the Indus Civilization: in 1921 at Harappa by Daya Ram Sahni and in 1922 at Mohenjo-daro by R.D. Banerji. If one believed in

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

jubilees of such discoveries—and why shouldn't one?—then one might as well call the year of publication of the present volume as the Diamond Jubilee Year of this great discovery which threw at one stroke the antiquity of civilization on this subcontinent back by at least two millennia: for before 1921 it was generally held that India had no past to boast of and civilization began here only after the invasion of Alexander in 326 B.C.

The initial discovery of Mohenjo-daro and Harappa was followed by large-scale excavations at these two sites: at the former, first by John Marshall and his colleagues and thereafter by E.J.H. Mackay; and at the latter by M.S. Vats. To these may be added Chanhu-daro, excavated by Mackay. The details brought to light at these sites, viz. systematic town-planning, organized drainage, granaries, workmen's quarters, baths, public halls and other buildings,coupled with seals, sealings, weights and measures left no doubt in anybody's mind that this civilization matched contemporary civilizations anywhere in the world. Nay, the use of kiln-baked bricks and systematic town-planning would rank the Indus Civilization even above some of those civilizations.

For a while the spade lay low, but in 1946 Mortimer Wheeler swung it into action at Harappa and brought to light a fortification-wall around Mound AB. Wheeler's work sought to give a new dimension to the Indus Civilization in two ways. In the first place he made out that the Indus Civilization was ruled from a 'Citadel'. Secondly, he held that it was destroyed by the incoming Aryans, one of whose gods, Indra, is known as the destroyer of forts, *purandara*.

When after the partition of the country, hardly any Harappan Culture site worth the name remained on the Indian side of the border, Indian archaeologists bravely took up the challenge. A. Ghosh's exploration brought to light many a site in the Ghaggar valley, while the work of S.R. Rao in Gujarat not only settled the Indus-affiliation of the debated site of Rangpur but also brought to the fore a host of other sites in that area. His excavation at Lothal added another dimension to the Indus Civilization, viz. that of its maritime trade with Mesopotamia *via* the Persian Gulf. The excavation at Kalibangan in Rajasthan, initiated by one of the editors of this volume (B.B. Lal) and continued by him along with B.K. Thapar and J.P. Joshi, showed that not only was the so-called 'Citadel' fortified but also the 'Lower Town'. At Kalibangan was also identified a settlement which underlay the remains of the Indus Civilization. Ascribable to this earlier period was a ploughed field which can easily boast of as being the earliest ploughed field discovered anywhere in the world. Many more sites, including Surkotada in Gujarat, Daimabad in Maharashta, Mitathal and Banawali in Haryana, Ropar (now called Rupanagar) in Punjab, and Alamgirpur and Hulas in Uttar Pradesh, have been excavated on the Indian side of the border,which have added in one way or another to our knowledge of Indus Civilization. For example, Alamgirpur and Hulas show an intrusion of the Indus Civilization even into the (upper) Ganga-Yamuna *doab*.

On the other side of the border, in Pakistan, no less remarkable work has been done: Amri, excavated by J.M. Casal, and Kot Diji, by F.A. Khan, showed substantial evidence of what preceded the full-fledged Indus Civilization. Likewise, important are the excavation at Gumla by A.H. Dani, Balakot by George F. Dales and Allahdino by Walter A. Fairservis. The work of F.A. Khan and M.A. Halim at Sarai Khola, of Rafique Mughal at Jalipur, of the Allchins at Lewan and of F.A. Durrani at Rahman Dheri in the north-west and of Jean Francois Jarrige at Mehargarh in Baluchistan has also added a great deal to our knowledge, particularly about the gradual cultural evolution on this subcontinent. Mehargarh, for example, takes us back to about the seventh millennium B.C.

The discovery of an inscribed Indus seal at Altyn Depe in Soviet Central Asia and of pottery and an inscribed seal at Shortugai in Afghanistan clearly opens up a new area of Indus contact, since so far these contacts were thought to be with Western Asia only. Thus, with the passage of time, new frontiers of this great civilization are being opened up.

Ever since the discovery of the Indus Civilization, attempts have been made to decipher the Indus script. Many theories have been propounded about the use of the seals; and the language used therein has been thought to be Sanskrit or Dravidian or an ancestral form thereof, depending largely on the initial approach of the scholar concerned. Often the arguments have been circuitous. Obviously, therefore, the results do not stand rigorous scrutiny. Thus,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

today we are where we were before, except for the fact that the direction of writing is now established as being from right to left. As a result of these recent exercises, however, some very good compilations of the Indus texts have been published, and we feel grateful to the authors concerned.

There has also been a great deal of controversy about the chronological horizon of the Indus Civilization. While Marshall put it within the time-bracket of 3250-2750 B.C., Wheeler suggested 2500-1500 B.C. These dates were given primarily on the basis of comparative stratigraphy and on Indo-Mesopotamian contacts. In those days the Radiocarbon (^{14}C) dating was not known. With the help of this new tool, D.P. Agrawal has suggested a date between 2300 and 1750 B.C. However, it has to be remembered that all is not well with the ^{14}C dates and one cannot accept them raw. Taking MASCA-correction into account, the formative stage of the Indus Civilization may well go back to the turn of the first — second quarters of the third millennium B.C., the mature phase may have centred round the middle of that millennium, and the end may have come by 2000 B.C. or soon thereafter.

Questions like the origin of the Indus Civilization are ever-burning ones. Though theories have been propounded that this civilization owes its origin to the West Asian civilization, nothing very convincing has so far been set forth in this regard. Failing this, shelter has been sought under the oft-repeated maxim that even 'ideas have wings'. The question needs a much deeper probe,in which the data available from the various cultures which preceded the Indus Civilization in the Indus valley itself and in the Baluchi hills have to be duly assessed.

How this great civilization came to an end is another question which still remains to be answered satisfactorily. The theory of 'Indra stands accused' has been sufficiently commented upon by various writers and so also the destruction by floods. The shifting of rivers and the wearing out of the landscape by excessive exploitation could be other factors. In fact, one single cause may not explain the entire situation. Further, it has to be remembered that cities may rise and fall, but the people and their traits cannot be completely wiped out. Even today we find many an element that is surprisingly reminiscent of the Indus Civilization. Would one believe that the gauge of the bullock-cart in the lower Indus valley is exactly the same as it was in the Indus days; or the present-day grid pattern of ploughing the field, so as to sow black gram in one set of rows and mustard in another, goes back to pre-Harappan times? Do not the innumerable bangles put on by Marwari ladies today remind one of the supple arms of the dancing girl from Mohenjo-daro? Detailed work has, therefore, to be done on the legacy of the Indus Civilization.

In this volume are presented fifty papers from scholars in India and abroad. Although the coverage is not as exhaustive as we had originally planned, there is, we believe, a reasonably good cross-section of the problems involved and how these are being or likely to be tackled.

While the opening paper, by B.K. Thapar, summarizes the discoveries and various views relating to certain aspects of the Indus Civilization, the papers by G.L. Possehl and M.A. Konishi deal with such fundamental issues as terminology. The questions raised are as to what should be called 'culture', 'civilization', 'urbanization', etc., and in the context of certain antecedent cultures how far it is appropriate to use terms like Early Indus or Early Harappan. More or less connected with the issue is the paper by Dilip K. Chakrabarti, which discusses the various theories regarding the origin of the Indus Civilization. Commenting on the northerly expanse of this civilization, F.R. Allchin says that because of environmental, economic and possible politico-military reasons, the mature phase did not penetrate the Bannu and Potwar regions and only the early phase continued to persist.

The next set of papers deals with the structural remains at Indus sites. On the basis of the settlement pattern at Kalibangan, B.B. Lal suggests that the population was divisible broadly into three classes: a priestly class, an agriculturist-cum-mercantile class and a workers' class. He also states that the so-called 'Citadel' may not have been a ruler's stronghold but a complex enclosing religious buildings, as well as residences of the priests. Discussing the details of the gateways of the Harappan fortifications, Arun Kesarwani shows that the fortifications were not for military purposes, but against floods as protection, and as a symbol of social status. M. Jansen brings to light details of a part of Mohenjo-daro which had been excavated long back by Q. M. Moneer, but the results of which

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

were never published. R.S. Bisht presents for the first time a somewhat detailed account of the bipartite plan of Banawali. Marcia Fentress attempts a fresh stratigraphic correlation between Harappa and Mohenjo-daro on the one hand and between the Irano-Baluchi and Indus sites on other.

Of the four papers that follow, each one touches on an individual aspect. Thus, B.M. Pande puts forward a new approach to the understanding of the glyptic art of the Indus seals while G.F. Dales questions the identification of the two categories of stone objects, which are generally taken to be *yoni* and *linga*. The lithic tools of the Indus Civilization have not received the attention they deserve — a lucuna now filled to some extent by Jonathan M. Kenyor who deals with the blade industry recovered by Dales in his excavations at Mohenjo-daro. The skeleton of a camel found way back at Mohenjo-daro but unreported so far, has been dealt with by Richard H. Meadow, who identifies it as a domesticated Bactrian variety.

The next two papers, respectively by V.B. Mainkar and Brij Bhushan Vij, deal with the weight and measures used by the Indus people. They both emphasize the use of a decimal system. Besides, Mainkar, citing historical parallels, suggests that there were two groups of weights, one for weighing precious materials and the other, heavier ones.

The papers by R.C. Agrawal and D.P. Agrawal deal with metallurgy. According to the former, the copper tools found at the Harappan sites in Rajasthan and Haryana may have originated from Ganeshwar or thereabouts in the Aravallis. The study of the latter covers a much wider range of metals, their sources and technology, including alloying.

As mentioned earlier, the Indus script has so far eluded acceptable decipherment to all. Nevertheless the attempts made deserve every credit. Here we present the approaches of scholars from four different countries, viz. Knorozov *et al* from USSR, J.V. Kinnier Wilson from the U.K., Asko Parpola from Finland, and S.R. Rao from India. As would be seen, their conclusions differ very widely.

The next two papers, respectively by S.C. Malik and Y.M. Chitalwala, deal with the sociological aspects of the Harappans. It has been argued that class-stratification had already begun to appear in the Harappan times, a conclusion also arrived at by B.B. Lal on the basis of the Kalibangan evidence (above, p.p.).

The discovery of Lothal and a host of other sites in Gujarat State has shown that it was an important zone of the Indus Civilization. K.V. Soundara Rajan thinks that this civilization reached the Gujarat peninsula via Kutch, where there exist some noteworthy sites like Desalpur and Surkotada.

While cities of the Indus Civilization have always allured excavators, evidently because of their vastness and yield of rich finds, the lesser sites have not. However, here is presented a picture of short-lived nomadic and village sites of Vallabhi and Kanewal in Gujarat, excavated respectively by R.N. Mehta and K.N. Momin.

Daimabad in Maharashtra has of late become prominent in archaeological news because of the discovery of four heavy bronzes, depicting animals and a chariot drawn by bulls. Though the finds were not from exavations, some scholars are of the view that these objects may have had Harappan inspiration. Be that as it may, excavation at the site has shown a series of very early chalcolithic cultures with which Harappan contact is also indicated by some of the finds. S.A. Sali deals with this problem.

That there did exist various chalcolithic cultures in Central India and Gujarat, besides those in Maharashtra, which were contemporary with the Indus Civilization, is brought out by M.K. Dhavalikar who also highlights the interaction between the Indus Civilization on the one hand and the Prabhas and Kayatha cultures on the other.

Taking into account the results of excavations and explorations at various sites in Punjab, Haryana and western Uttar Pradesh, K.N. Dikshit brings out some distinctive traits which characterize the Late Harappan and other devolutionary stages.

From India we may turn our attention to countries on the west. G. Stacul dwells on the cultural influences exerted by the late stage of the Indus Civilization in the Swat Valley. Walter A. Fairservis presents a paper on the protohistory of Baluchistan, based on the data prior to the discovery of Mehargarh. He works out four stages of cultural development, from aceramic times to the full-fledged Bronze Age and also discusses the possible origin of the Indus Civilization from the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Baluchi scene. The discoveries at Mehargarh by J.F. Jarrige have further cleared the mist over what went on in these Baluchi hills. Unique in many respects, the site has as much as 9 metres of aceramic deposit, followed by Chalcolithic and Early Bronze Age ones. A reference has already been made to the discoveries at Shortugai in northern Afghanistan (above p.p.). In his paper, H.P. Francfort details the various Harappan finds from this site and discusses their importance, highlighting the trade-aspects. J.C. Gardin dwells on the canal-irrigation system prevalent in this very region of Afghanistan during the third and second millennia B.C. He feels that the system had nothing to do with Mesopotamia and Central Asia, but may have originated either locally or even was inspired from regions to the south-east. The evidence from the area, anciently known as Turan, comprising northern Iran, south Turkmenia and northern Afghanistan, has been reviewed by Philip Kohl with a view to assessing its alleged contribution in the make-up of the Indus Civilization.

It has often been asserted that most Baluchi cultures were but an extension of those in Iran. Denis Lee Heskel critically reviews the situation and holds that this was not the case, and that there may have been only marginal contacts through some common central places. In the same context, C.C. Lamberg-Karlovsky cites the evidence from Tepe Yahya, where in a single house he found a Baluchi painted pot and a bronze disc of Bactrian type, along with proto-Elamite tablets of the late fourth millennium B.C. The site has also yielded a potsherd bearing the stamp of a Harappan seal, though from a different level. Not much has been published about the rich material excavated at Shahdad in the Kirman region of Iran. Shashi Asthana deals with some of these objects from this site and highlights their significance in the east-west trade of the third millennium B.C.

Basing her argument on some of the finds of the Indus valley, in particular on certain similarities between the scenes depicted on the Indus and Mesopotamian seals, E.C.L. During Caspers suggests that there is a case for recognizing the presence of a Sumerian colony on some of the Indus sites.

C. Serge presents a fairly detailed paper on the archaeology of the Oman peninsula during the third and second millennia B.C., and points out certain similarities between his material on the one hand and that from Mesopotamia and the Indus valley on the other. After a critical study of the art objects from the Indus valley, Mesopotamia, Iran, Afghanistan and Soviet Central Asia Sheila L. Weiner makes out a case for substantial cultural interaction in between these regions during the Bronze Age.

Whereas the external trade-contacts of the Indus Civilization have been receiving great attention all along, very little work has been done on the internal trade itself. Constructing a model based on pre-industrial India, in which one town specialized in one craft and became a centre for its supply, S.P. Gupta suggests that Chanhu-daro may have been such a centre for seals, Kot Diji for blades, and Lothal for beads. He also works out the trade-routes between Mohenjo-daro and Kot Diji as also between Harappa and Kalibangan.

The find of a large number of skeletons in the habitation area at Mohenjo-daro had been taken as evidence for a massacre by the invading Aryans, to whom the end of the Indus Civilization had, therefore, been attributed. The Aryan theory, however, was challenged by B.B. Lal and G.F. Dales on various grounds. To this issue comes K.A.R. Kennedy, a physical anthropologist, who, having examined these skeletons in detail, comes to the conclusion that the persons concerned died owing to some water-borne diseases, and malaria, rather than at the hands of an enemy. K.M. Srivastava also challenges the theory of Aryan invasion and suggests that the end of the Indus Civilization may have been due to various other causes, like change of climate and river-courses and declining trade.

The papers by Bridget Allchin, R.L. Raikes, V.N. Misra, and Yashpal *et al*, deal with the environmental conditions in which the Indus Civilization originated, flourished and devolved. Raikes still holds the view that the end of Mohenjo-daro was due to its engulfment by a long-drawn flood resulting from land-uplift lower down the Indus, while Misra says that there are no satisfactory reasons to suppose that drastic climatic changes were responsible for the end of the Indus Civilization. On the other hand, he attributes this to a change of the river-courses. The paper by Yashpal *et al* brings a fresh approach to environmental studies, made through satellite photography, suggesting that the Sutlej and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Yamuna once flowed into the Ghaggar.

At the end, comes the paper by M. Rafique Mughal. He has carried out intensive explorations along the dry bed of the Hakra (Ghaggar) river in Pakistan, which have brought to light a large number of sites carrying the story from the Harappan to post-Harappan, Painted Grey Ware, times.

The three following papers by Durrani, Joshi and Dikshit form a distinct category since they throw light on specific problems of new and old discoveries.

B.B. Lal
S.P. Gupta

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Authors

1. B.K. THAPAR C/o Archaeological Survey of India, New Delhi
2. G.L. POSSEHL University of Pennsylvania Museum, Philadelphia
3. M.A. KONISHI Deptt. of Anthropology, Hosei University, Tokyo
4. DILIP CHAKRABARTI Deptt. of History, Delhi University, Delhi
5. F.R. ALLCHIN Deptt. of Oriental Studies, Cambridge University, Cambridge
6. B.B. LAL Indian Institute of Advanced Studies, Simla
7. ARUN KESARWANI University of Pennsylvania, Philadelphia
8. M. JANSEN Project Mohenjodaro, Deptt. of Architecture, University of Aachen, (FRG)
9. R.S. BISHT Archaeological Survey of India, Srinagar (J&K)
10. MARCIA FENTRESS Center for South & South East Asian Studies, University of California, Berkeley
11. B.M. PANDE Archaeological Survey of India, Vadodara
12. G.F. DALES Deptt. of Anthropology, University of California, Berkeley
13. J.M. KENYOR Center for South & South East Asian Studies, University of California, Berkeley
14. RICHARD MEADOW Harvard University, Peabody Museum, Cambridge Mass.
15. V.M. MAINKAR Now late. Indian Standard Institute, New Delhi
16. B.B. VIJ ED – 137/1, Tagore Garden, New Delhi
17. R.C. AGRAWALA C – 623, Gandhi Nagar, Jaipur
18. D.P. AGRAWAL Physical Research Laboratory, Ahmedabad
19. Yu. KNOROZOV, B. VOLCHOK, N. GUROV, Deptt. of Anthropology, University of Leningrad, Leningrad
20. J.V. KINNIER WILSON, Deptt. of Oriental Studies, Cambridge University, Cambridge
21. ASKO PARPOLA Deptt. of Sanskrit, University of Helsinki, Helsinki
22. S.R. RAAO 1233, 34th Cross, Jayanagar, Banglore
23. S.C. MALIK Indian Institute of Advanced Studies, Simla
24. Y.M. CHITALWALA Deptt. of Archaeology, Jubilee Bagh, Rajkot
25. K.V. SOUNDAR RAJAN C/o Archaeological Survey of India, Janpath, New Delhi
26. R.N. MEHTA C/o Deptt. of Ancient History, Baroda University, Vadodara
27. K.N. MOMIN Deptt. of Ancient History, Baroda University, Vadodara
28. S.A. SALI Archaeological Survey of India, Janpath, New Delhi
29. M.K. DHAVALIKAR Deccan College, Pune
30. K.N. DIKSHIT Archeaological Survey of India, Janpath, New Delhi
31. G. STACUL, Institute di Storia Antica, Trieste University, Italy
32. W.A. FAIRSERVIS American Museum of Natural History, New York
33. J.F. JARRIAGE Musee' Guimet, 6 Place d'lina, Paris
34. H.P. FRANCFORT Musee' Guiment, 6 Place d'lina, Paris
35. J.C. GARDIN Musee' Guimet, 6 Place d'lina, Paris
36. PHILIP KOHL Wellesely Collge, Wellesely, Cambridge Mass.
37. DENIS HESKEL Deptt. of Anthropology, Harvard University, Cambridge Mass.
38. C.C. LAMBERG-KARLOVSKY Peabody Museum, Harvard University, Cambridge Mass.
39. SHASHI ASTHANA National Museum, Janpath, New Delhi
40. Elisabeth C.L. DURING CASPERS Kern Institute, Deptt. of Archaeology, Leiden
41. C. SERGE Archaeology, C.N.R.S. 3, Rue Michelet, L Paris
42. SHEILA WENIER, 93 Ivy Street, Brookline, Mass. 02146
43. S.P. GUPTA National Museum, Janpath, New Delhi
44. K.A.R. KENNEDY Deptt. of Anthropology, Cornell University, Ithaca, NY
45. K.M. SRIVASTAVA Archaeological Survey of India, Janpath, New Delhi
46. BRIDGET ALLCHIN Center of South Asian Studies, Cambridge, U.K.
47. R.L. RAIKES, Hydrologist C/o Pakistan Archaeological Deptt. Karachi
48. V.N. MISRA Deccan College, Pune
49. YASHPAL, BALDEV SAHAI, R.K. SOOD, D.P. AGRAWAL C/o Physical Research Laboratory, Ahmedabad
50. M.R. MUGHAL Deptt. of Archaeology, Pakistan, Lahore
51. F.A. DURRANI Deptt. of Archaeology, Peshawar University, Peshawar
52. J.P. JOSHI, MADHU BALA, JASSU RAM, Archaeological Survey of India, Janpath, New Delhi
53. K.N. DIKSHIT op. cit.
54. K.S. RAMACHANDRAN Archaeological Survey of India, Janpath, New Delhi
55. H.D. SANKALIA Deccan College, Pune

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

1

B.K. Thapar

Six Decades of Indus Studies

Breasted's 'Fertile Crescent' has long been known as the cradle of civilization; knowledge of ancient Mesopotamian Civilization was available, albeit dimly, through the Old Testament and classical sources, and excavations undertaken during the latter half of the nineteenth century, principally at Nineveh, Nimrud, Nippur and Lagash, though described as 'an undignified scramble for archaeological loot; together with the rewarding decipherment in 1857 of the cuneiform script from the trilingual text inscribed at Behistun, had invested the evidence with some reality' (Glyn Daniel 1968; Whitehouse 1977).

HISTORICAL

Discovery And Initial Excavations And Explorations: 1921-47

Strangely enough, an equally ancient civilization of the Indus, with comparable environmental and economic pattern to that of Mesopotamia, had remained unrecognized and even unsuspected during these eventful years. And this despite the fact that the type-site, Harappa, had been extensively despoiled by brick robbing, and been excavated several times by Alexander Cunningham who had obtained various antiquities including a typical Indus seal (collected by a Major Clark), bearing pictographic characters (Cunningham 1875). India thus continued to be referred to as a country where 'there was no twilight before dark' (Barrett 1913).

It was not until 1921 and 1922 when preliminary trial diggings, at Harappa by Daya Ram Sahni, and at Mohenjo-daro by R.D. Banerjee, had yielded identical finds, including the exotic seals, that the potential of the sites came to be realized and the elements of a forgotten civilization identified. After examining the collection of antiquities from these two widely-separated sites and being convinced that they were totally distinct from anything previously known in India, Marshall announced the discovery in a London Weekly (Marshall 1924). This took the archaeological world by surprise, for the excavations at Ur by Leonard Woolley, almost during the same period, had already created a great sensation among Old World archaeologists. Writing elsewhere, Marshall (Marshall 1926) had averred that 'the discoveries had at a single bound taken our knowledge of Indian Civilization some 3000 years earlier'. Arthur Keith, while reviewing Marshall's book *Mohenjo-daro and The Indus Civilization,* had commented:

> Henceforth there are to be two Mesopotamias of ancient date. The one which lies along the lower reaches of the Euphrates and Tigris has long been known as the cradle of civilization; but that there existed an equally extensive and equally elaborate civilization on the banks of the lower Indus and of its twin river the Mihran is a new discovery. (Keith 1931).

India could thus take its rightful place, along with Mesopotamia and Egypt, as an area where 'civilizing processes were initiated and developed'. **(fig. 1.1).**

The two decades following these exciting discoveries at Mohenjo-daro and Harappa (virtually the period falling between the two world wars) witnessed sustained archaeological field-work in India, financial constraints of the thirties notwith-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

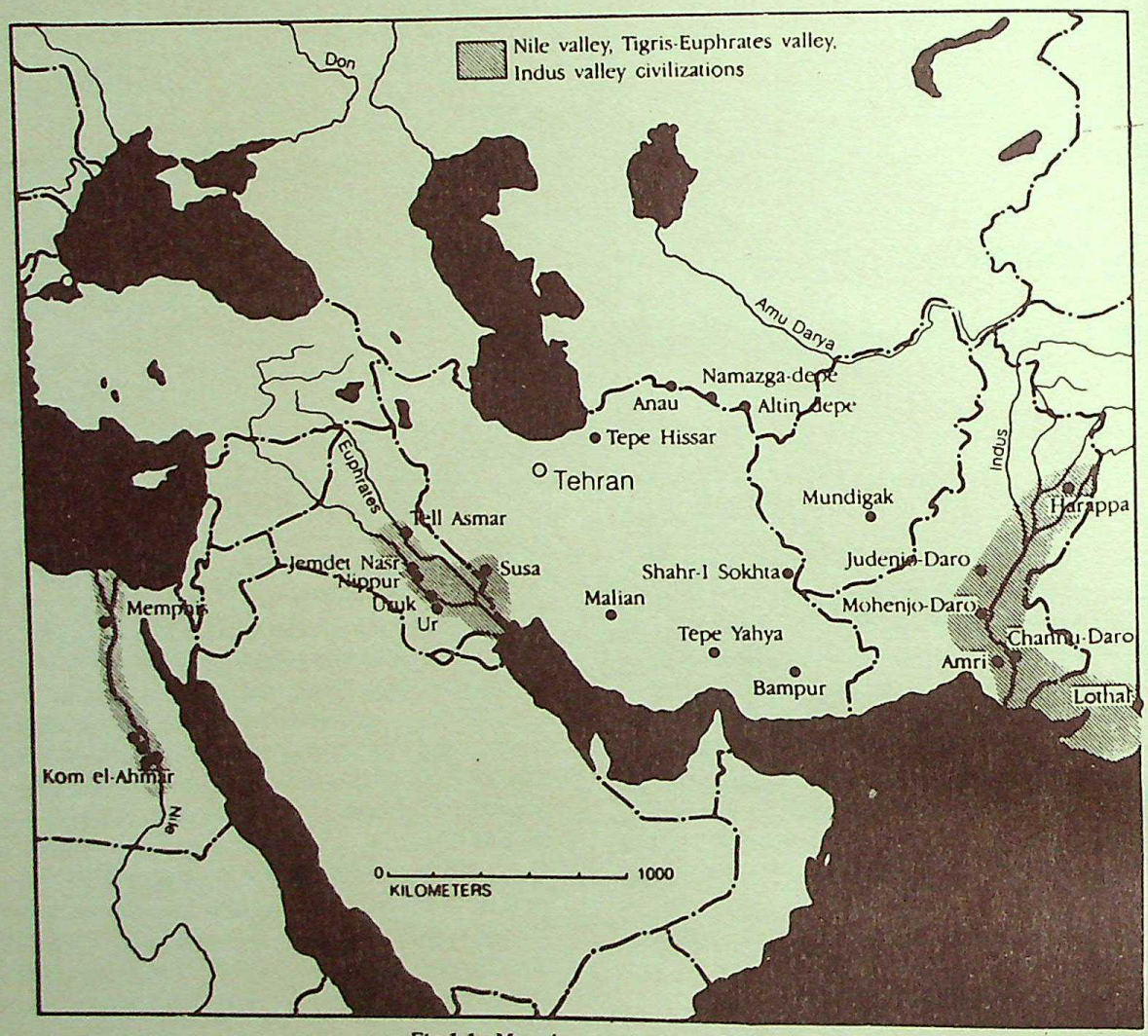


Fig.1.1. Map showing ancient cultures

standing: large-scale excavations were conducted at Mohenjo-daro (Marshall 1931, and Mackay 1938) and Harappa (Vats 1940), and systematic explorations were undertaken during 1926-27 and 1927-28 in Baluchistan (Aurel Stein 1929, 1930, 1931, 1937) and during 1929-30 and 1930-31 in Sind (Majumdar 1934) resulting in the location of numerous sites of Chalcolithic affiliation. The more important amongst these sites were Dabar Kot, Sur Jangal, Rana Ghundai, Periano Ghundai, Mughal Ghundai, Shahi Tump, Kulli, Nundara, Mehi and Sutkagendor in Baluchistan and Amri, Damb Buthi, Kohtras Buthi, Ali Murad, Pandi Wahi, Ghazi Shah, Jhukar and Chanhu-daro in Sind. Being fully occupied with the field-work in Baluchistan and Sind, no planned surveys could be undertaken in Punjab and Gujarat for ascertaining the eastern and southern limits of the Indus Civilization. However, Vats was able to identify two Harappan sites in Punjab, in 1929-30, at Kotla Nihang Khan near Ropar in the foothills of the Himalayas and in 1933 at Chak Purbane Siyal on the old bed of Ravi, some 20 km south-east of Harappa, (Vats 1935 and 1936), and one Harappan site in Kathiawad, Gujarat in 1935 at Rangpur in the erstwhile Limbdi State (Vats 1937).

Most of these explored sites represented different stages of cultural development, showing a wide assortment of ceramic industries some of which appeared to be pre-Harappan in character while others were contemporary or late/post Harappan in cultural content. In fact, during their reconnaissances, both Stein and Majumdar had undertaken trial-diggings at several sites to ascertain their cultural horizon. Meanwhile, during 1925-26, Hargreaves had conducted a fairly large scale excavation at Nal in the erstwhile

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Kalat state of Baluchistan, a site which had already been plundered, some twenty years earlier, by predatory digging and had yielded a unique type of polychrome pottery (Hargreaves 1929).

During 1927-28, prior to undertaking a systematic survey in Sind, Majumdar had undertaken trial-excavation at Jhukar near Larkana where he identified an essentially evolving sequence of the Indus Civilization, represented by two strata. The lower strata of this area belonged to the mature phase of the Indus Civilization as revealed at Mohenjo-daro; and the upper to an as-yet undefined late phase thereof (Majumdar 1931). And, during 1929-30, in the course of his survey in Sind, Majumdar undertook excavation at Amri where he found the deposits of the Indus Civilization stratified above those yielding an essentially different ceramic, which he labelled Amri culture.

The significance and value of these brief but intelligent sondages, as proved by later investigations, is decidedly out of all proportion to the amount of work done. During 1935-36, a joint expedition of the School of Indian and Iranian Studies and the Museum of Fine Arts, Boston, under Mackay, carried out considerable further work at Chanhu-daro where a threefold sequence was brought to light, showing from bottom upwards: Harappa, Jhukar and Jhangar cultures. The nature of the beginning of occupation at the site is still unknown because the high water-table prevented excavation up to the natural soil (Mackay 1943).

On the basis of the stratigraphical evidence provided by these excavations and on comparative study of the different wares and their decorations (Starr 1941) it was then possible to arrange the explored sites and the different phases of cultures represented by them in a sequence which ran as follows: Amri-Nal culture with earlier Iranian affinities of the Zhob culture; Kulli-Mehi culture, contemporaneous with the early phase of the Indus Civilization and showing points of similarity with some known cultures in Elam and Mesopotamia; Indus Civilization; Jhukar culture, showing a distinctive assemblage of pottery, stamp seals, metal tools and pins, contrasting strongly with that of the Indus Civilization and yet not without apparent contact with it; and Jhangar culture, a distinct break from the earlier sequence, using a grey or black pottery decorated with simple incised patterns of chevrons, herring-bones, triangles, etc.

The excavations at Mohenjo-daro, Harappa and Chanhu-daro had clearly shown up the form and cultural style of the Indus Civilization, being urban and riparian in character, with a seemingly monotonous homogeneity. Its chronological span was ascribed to an inclusive time bracket of *circa* 3500-2500 B.C. (below, p.). The area of its distribution was then known to be principally in the Sind plain with significant cultural contacts with sites in the secluded valleys of Baluchistan. Harappa and Chak Purbane Siyal on the Ravi in Punjab; Sutkagendor on the Dasht Kaur on the Makran coast, close to the Iranian border; Dabarkot, south of Loralai in Baluchistan and the two outposts, viz. Kotla Nihang Khan on the Sutlej in Punjab, and Rangpur on the Bhadar in Kathiawad, were the only recorded sites lying outside the Sind region.

This was the state of our knowledge of the Indus Civilization on the eve of the Second World War. And then tragedy struck a grievous blow to Indian archaeology. On 11 November 1938, while undertaking fresh field-work in Sind, Majumdar was killed by bandits at Rohel-jo-Kund, a Harappan site located on the Nai Gaj river (Krishna Deva 1949).

During the war (1939-45), three notable field-works were carried out: from December 1940 to March 1941 the indefatigable Aurel Stein undertook a survey of ancient sites along the dry bed of the Ghaggar or Hakra (the lost Sarasvati) between Hanumangarh and the deltaic portion below Derawar (Stein 1942). The results of his survey, in brief, were as follows: (i) the Hakra Branch Canal represents an ancient winding bed of the Sutlej that joined the Hakra between Walar and Binjor; (ii) likewise, the Desert Branch Canal follows an ancient bed of the Sutlej that joined the Hakra between Kudwala and Lurewala; (iii) the dry riverine belt of the Hakra becomes wider beyond Walar; (iv) numerous ancient sites were located between Walar and Lurewala; and (v) mounds with Chalcolithic pottery appear first near Fort Abbas and continue down the Hakra. **(fig. 1.2)**

Excepting the last-mentioned observation, relating to the absence of mounds yielding Chalcolithic pottery east of Fort Abbas, which by Ghosh's subsequent exploration in the area (Ghosh 1952, also below, p.) was proved incorrect, Stein's report was peculiarly perspicacious. With a view to supplementing the archaeological

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

explorations carried out in 1928-29 in Makran and Gedrosia, Stein undertook, during January-March 1943, the survey of the Las Bela area, extending from the coast of the Arabian Sea to the north-eastern confines of Makran (Stein 1943). In the course of his survey he located some mounds yielding Chalcolithic pottery in the northernmost tract called Walpet, noteworthy amongst which was Niai Buthi. Unfortunately, he missed visiting Balakot near Sonmiani which later was identified as a Harappan site (Raikes 1968) and has been under excavation during 1973-76 (Dales 1981).

The second war-time field-work was by Brigadier E.J. Ross who, while in command of the troops in the Loralai and Zhob districts during 1935-40, located a large number of new sites in the area and undertook excavation at Rana Ghundai (Ross 1946), situated about 13 km east of the military station of Loralai, close to the Fort

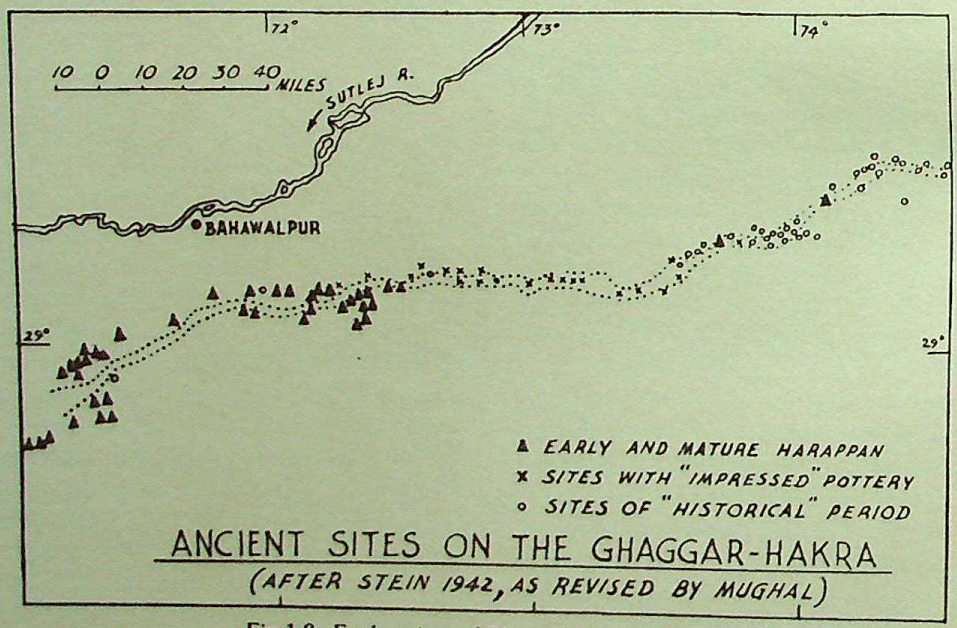


Fig.1.2. Explorations of Ghaggar: Aurel Stein

Sandeman Road. The excavation, which, in fact, was an intelligent observation of a section-scraping, revealed a sequence of five-fold cultural periods, of which the earliest represented a somewhat nomadic or pastoral subsistence pattern, with hand-made pottery, flint-blades, bone points, eyed needle, etc. Period II, referred to by the excavator as the Bull Period, is marked by the use of a beautifully finished, decorated pottery, showing stylized figures of humped bulls and black bucks. Period III followed after a temporary desertion of the site and shows three phases of buildings and continuous evolution of ceramic styles, deriving from Period II. There was, however, a break in occupation of the site, resulting from destruction by fire, after the settlements of Periods III and IV. In this sequence which became a key to the interpretation of the Zhob valley cultures, the latest phases of Rana Ghundai III overlapped with the Indus Civilization. For, the Rana Ghundai IV showed Harappan, Jhukar and post-Jhukar cultures.

The third war-time field-work was by Stuart Piggott who, in the course of his survey of sites around and south of Quetta in 1944, identified a new ceramic (Quetta Ware). This ware indicated a local variant of the Iranian Buff Ware group of cultures which flourished in the later part of the fourth millennium B.C. (Piggott 1947).

From the foregoing it would be apparent that, during the twenty-five years after the first recognition of the distinctive elements of the Indus Civilization, investigations were directed largely towards ascertaining its identity, general character and spatial distribution. Very little work was done to trace its ancestry and growth with the result that, in 1946 when Wheeler undertook fresh excavation at Harappa, the Indus Civilization still presented a picture of 'sudden and uniform, efflorescence devoid alike of genesis and decay'. The main objectives of Wheeler's excavation, however, were: firstly to establish the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

existence or absence of a defensive system around Mound AB, which showed a parallel situation to the Stupa Mound at Mohenjo-daro and to correlate it with the occupation of the site. Secondly, to establish a stratigraphical relationship between the Harappan Cemetery R-37 and Cemetery H.

The excavation fulfilled both these objectives in a positive sense and, in the process, provided some significant evidence which had not been anticipated at the time of planning the excavation. The presence of a defensive wall round the relatively small, detached, Mound AB lent strong support to the postulate that the social structure of the Indus Civilization conformed in principal with that of Sumer wherein the civic focus was the exalted temple with a chief deity in whom was vested the wealth, and religious and secular authority. The stratigraphical priority of the Harappan Cemetery R-37 to Cemetery H was duly established with a hiatus between the two. After examining afresh the available evidence, Wheeler had suggested the millennium 2500-1500 B.C. as a possible inclusive date for the Mature Harappa Civilization, without prejudice to the still unplumbed depths of Mohenjo-daro (Wheeler 1947).

The significant evidence provided by this excavation, referred to above, relates to the existence of a deposit yielding a non-Harappan ceramic, generally comparable with some north Baluchistan village cultures. This deposit was clearly stratified below the base of the Harappan fortification and above the natural soil. Harappa thus became the second site, after Amri (above, p.0), to have provided evidence of an antecedent culture and more than a hint of a succeeding one.

To the genesis of the Harappa Culture we shall return later (below, p.0). Meanwhile, an event of great political significance happened in 1947 when the subcontinent was divided into the two independent republics of India and Pakistan, as a result of which, all the known area of the Indus Civilization fell within the political frontiers of Pakistan, leaving only the two outposts, Kotla Nihang Khan near Ropar on the Sutlej, and Rangpur on the Bhadar in Kathiawad, within the territory of India.

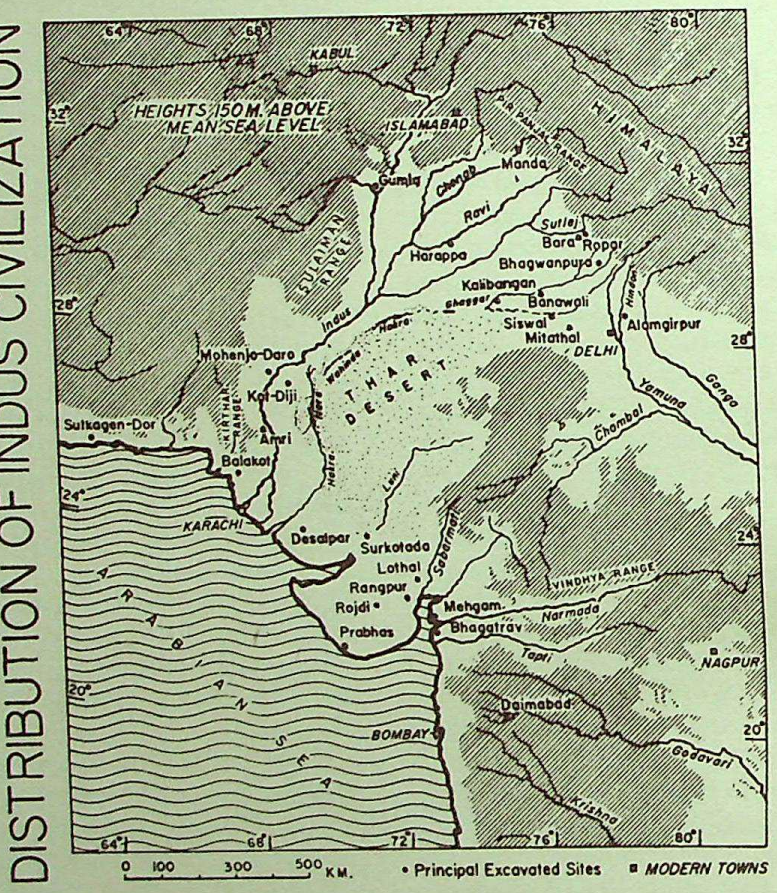
Problems and Further Investigations: 1947-81

Within about four years of the Partition, planned surveys were undertaken in India to locate more sites of the Indus Civilization in the regions contiguous to Pakistan frontiers, especially in Rajasthan, Punjab and Gujarat. In 1951-52, A. Ghosh undertook the exploration of the Ghaggar valley and identified as many as twenty-five Harappan sites within the present-day borders of India in the region beginning right from Pakistan border (eastwards); upto midway between Hanumangarh and Suratgarh in the Sarasvati valley and about 22 km east of Bhadra in the Dhrishadvati valley (Ghosh 1952). Noteworthy among these sites was also Kalibangan which to Stein seemed to '. . . offer interest as marking an extensive site used mainly for burning bricks.' He had observed that the two '. . . mounds are composed almost entirely of kiln remains and the painted sherds found among them leave no doubt about the kiln having been worked down to the Kushan period' (Stein 1942). Stein had obviously failed to identify the Harappan remains including pottery. The scatter of brick bats and potsherds noticed by him on the mound represented in fact the telltale evidence of brick-robbing resorted to at the site for laying the Hanumangarh-Suratgarh section of the rail-track; coincidentally, a parallel situation to that of Harappa.

During 1952-55, excavation was undertaken at Ropar where the Harappan remains were found for the first time stratified between the deposit yielding the Painted Grey Ware and the natural soil (Sharma 1955). A similar sequence was later (1958) identified at Alamgirpur, some forty-five km north of Delhi on the Hindon, a tributary of the Yamuna. In subsequent years, explorations were continued in Rajasthan, Haryana, Punjab and the Meerut and Saharanpur districts of Uttar Pradesh by various scholars including K.N. Dikshit, B.K. Thapar, Suraj Bhan and J.P. Joshi. The explorations were partly on a village-to-village survey basis and partly along the river Ghaggar, Sarasvati, Markanda, Sutlej and Beas as a result of which the number of Harappan and late Harappan sites located in this (eastern) region now runs to over 220. With these discoveries the eastern limit of the Indus Civilization continues to be Alamgirpur but its northern limit has been extended up to Manda, located on the right bank of the Chenab in the foothills of the Pir Panjal range, 28 km west of Jammu. In this eastern region as many as seventeen sites have

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

been excavated to a varying scale of work (Thapar 1981). Noteworthy amongst these are Ropar and Bara (1952-55), Kalibangan (1960-69), Siswal (1970), Mitathal (1968), Banawali (1975-77), Bhagwanpura (1956-76),



Manda (1976-77) and Hulas (1978-80). Of these, Kalibangan (Lal 1962, 1971, 1979; Thapar 1969, 1975) provides a sequence from pre-Harappan to the Mature Harappan. The culture-traits of the two periods of occupation were clearly defined principally through ceramics, size of bricks, orientation of houses, size and material of the blade, etc. **(fig. 1.3)**.

The Pre-Harappan ceramics, while showing some basic similarity with ceramics of a comparable period at Harappa, Amri and Kot Diji, presented a distinct genre in decoration and shape (Thapar 1969; Lal 1979). The size of the bricks used was 30 × 20 × 10 cm as against the Harappan 40 × 20 × 10 or 30 × 15 × 7.5 cm. Likewise. the blades used in the pre-Harappan levels were smaller in size than those of the Harappan occupation, besides being of different

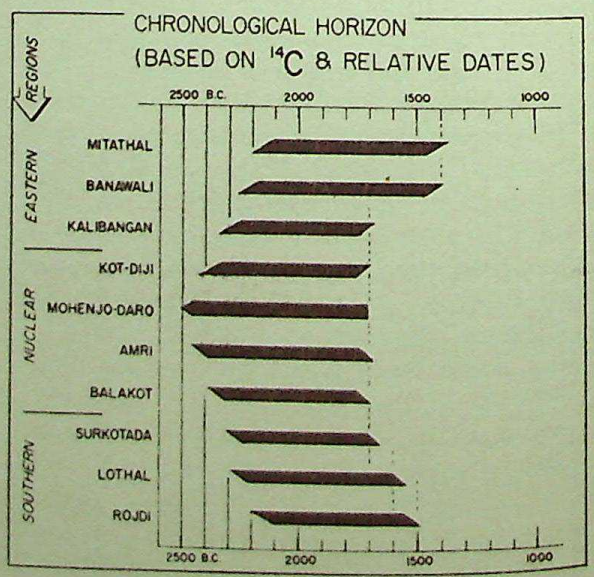


Fig.1.3. Extent & Chronology of Harappa Culture

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

material. An important discovery relating to this period was a ploughed field, showing a grid of furrows, affording the cultivation of two cereals at a time (Lal 1971). The occupation seems to have been brought to a close through a seismic catastrophe resulting in the abandonment, though temporary, of the site.

The Harappan occupation of the site followed the pattern of Mohenjo-daro and Harappa in having two separate parts, viz. the citadel on the west and the lower city on the east. Excavation, however, revealed differences in the layout plan of the citadel at Kalibangan with those of Mohenjo-daro and Harappa as also in the structural details thereof. The lower city at Kalibangan was also found to be fortified, a feature not attested to either at Harappa or at Mohenjo-daro. Among burial practices also, some new types were recorded at Kalibangan (Thapar 1975; Lal 1979).

The Kalibangan sequence, though not representative of the entire eastern region, nevertheless provided a useful index for understanding the manifestation of the pre-Harappan, Harappan and Late Harappan cultures in Haryana and Punjab. Pre-Harappan occupations were identified both at Banawali and Siswal, the associated ceramic, however, showed some variant elements at Siswal. Siswal and Mitathal provided evidence of an evolving sequence from the pre-Harappan through Mature Harappan to the inadequately defined Late Harappan. It may be recalled that two copper harpoons had also been reported from the latter site as chance finds obtained through ploughing. The Harappan occupations at Ropar and Manda located in the foothills, represent the limit of the ecological zone which the pre-Harappans and Harappans could reach or exploit, besides being important centres for supplying teak to the settlements in the valleys below. The importance of Alamgirpur and Hulas lies in their geographical position in the Yamuna basin. This was across the divide of the Indus and Yamuna systems beyond which lay the real Indian monsoon-fed jungle which the Indus people found difficult to bring under cultivation without an ample supply of metal (perhaps iron). The other two sites which provided significant evidence of the decline of the Indus Civilization are Bara and Bhagwanpura (Joshi 1978). The cultural equipment of the former site though belonging to the first quarter of the second millennium B.C. included an individualistic pottery showing painted and incised decoration. The antecedents of this pottery are traceable to a pre-Harappan tradition. Bhagwanpura provided evidence of an effete Harappan culture interlocking with the Painted Grey Ware cultures thus purporting to fill the earlier known gap between the two cultures.

In Gujarat, excavations were conducted at Rangpur first by M.G. Dikshit (1957) and later by S.R. Rao (1953). Simultaneously, Rao explored a large area in Gujarat including Kutch and Kathiawad and located several Harappan and sub-Harappan sites, the southernmost (Bhagatrav) being located on the estuary of the Tapti (Rao 1963). Further explorations by J.P Joshi (Joshi 1972), the M.S. University of Baroda and the Gujarat State Department of Archaeology added more Harappan and sub-Harappan sites to the above list, bringing the total number of such sites in the Gujarat region to over 190. Recent excavation has added another site in Maharashtra.

Among these newly discovered sites as many as fourteen were excavated to a varying scale of work (Thapar 1981), noteworthy of which are Rangpur (1953), Lothal (1955-63) Prabhas Patan, (1956-57, 1975-77), Rojdi (1957-58), Desalpur (1963-64), Surkotada (1972-75) and Daimabad (1974-79). The last mentioned site, being located on the Pravara, a tributary of the Godavari. This has extended the distribution-limit of the Indus Civilization further south in the Ahmednagar district of Maharashtra. The excavated sites in this region, besides showing some essential marks of the Indus Civilization, also provide evidence of transitional or succeeding phases, reminiscent of Harappan modes and, in some cases, of divergent cultures, quite different from cultures of comparable period met with at Jhukar and Cemetery H. Of these sites again, Lothal and Surkotada have been excavated on a large-scale, the former for eight seasons and the latter for three. The layout plan of both these cities was different from each other as also their cultural sequence. Both of them, however, show the impeccably Harappan character in their main occupation, viz. Lothal A and Surkotada IA. While Surkotada provided evidence *inter alia* for the diffusion of the Indus Civilization from the nuclear area by the land route (corroborated by subsequent discoveries of sites in lower Sind,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Gharo Biro, Karahyo Pir, Koonj Sar, Kot Kori; Rauf Khan 1981); Lothal, through finds of a dockyard, warehouse and a Persian Gulf style button seal, pointed to the maritime contacts of the coastal site. Some new pottery types and decorations of up-Indus style indicate regional ramifications of the civilization.

In Pakistan, the investigations into the Indus Civilization were resumed with equal vigour and informed purpose. In 1950, Wheeler (1968) reassured by the results of his 1946-excavation at Harappa, undertook further excavation of the Stupa Mound at Mohenjo-daro. The excavation laid bare the podium of a large granary with criss-cross layout of passages between blocks of brick-work for ventilation and a provision of loading facilities in the shape of an alcove in the northern face of the platform. The excavation also indicated that the buildings within the citadel overlie an artificial mound built of mud-bricks and mud, dating from the optimum phase of the city's development. The existence of a regular defensive-system, to retain the platform in the manner revealed by the equivalent system at Harappa, however, was not established. But some solid baked brick towers, two of them flanking a postern gate at or near the south-eastern corner, and another on the west side of citadel, again with a small postern, were duly exposed.

In 1950-51, Fairservis carried out surveys in the Quetta valley and the Zhob and Loralai districts (Fairservis 1956, 1959), as a result of which a larger number of sites with varying ceramic styles were located. Of these, the potential ones like Kile Gul Mohammad, Damb Sadaat, Kechi Beg, Karez, Sur-Jangal and Dabar Kot were also excavated. This provided a relative cultural sequence to the upland valleys of north-eastern Baluchistan, ranging from the pre-pottery Neolithic (Kile Gul Mohammad I) through Neolithic (Kile Gul Mohammad II), pre-Harappan, (from earlier phases onwards, Kile Gul Mohammad III, Sur Jangal I, Kile Gul Mohammad IV-Damb Sadaat I, Sur Jangal II; Kechi Beg — Damb Sadaat II-Quetta ware, Damb Sadaat III, Sur-Jangal III, Zhob Mother Goddess cult) to Harappan (Dabar Kot late levels and Periano Ghundai, showing Zhob cults, part contemporary with the urban Indus Civilization). A radiocarbon date of 3350 ± 200 B.C. for samples obtained from the upper phase of Kile Gul Mohammad I invests the sequence with a datum. Meanwhile, Beatrice de Cardi in the course of her reconnaissance in Kalat carried out excavations at Anjira and Siah Damb. She established a sequence of five cultural periods beginning with the Neolithic, comparable to Kile Gul Mohammad II and ending with the corresponding final period of Damb Sadaat. Period III of this sequence, equated to Damb Sadaat I yielded, besides the Amri-Kechi Beg pottery, two new wares called Togau and Zari (de Cardi 1951, 59, 1964 and 1965).

During 1955-57, the Pakistan Department of Archaeology, under F.A. Khan, carried out an excavation at Kot Diji near Khairpur in Sind, about 40 km east of Mohenjo-daro across the Indus. They found, startified below an open Indus settlement, a fortified citadel with environing occupation beloning to an antecedent culture labelled by the excavator as Kot Diji (Khan 1958, 1965). The excavation, while defining the elements of this antecedent culture, focussed attention on the beginnings of the Indus Civilization. In the wake of this discovery, Jean Marie Casal carried out three seasons of intensive work at Amri during 1959-62 (Casal 1964), identifying five periods of occupation, of which the latest (Period V) was sixteenth century Muslim. Periods I-IV with sub-divisions A B C and D in the earliest (more appropriately-called Amri) showed an evolutionary sequence with the hesitant infiltration of the Harappa Culture in Periods I.D., II, III and IV. These take the sequence through Intermediate Harappa Transitional and Jhukar to Jhangar cultures. The excavations provided *inter alia* further light on the growth of the Indus Civilization. In the following years (1962-65), Casal excavated the Kulli site of Nindowari Damb, situated on the Kud river, a tributary of the Purali in the Ornach valley north of Bela, where an interrelationship and partial contemporaneity of the Kulli culture with the Harappan culture was indicated. A significant feature of the excavation, however, was the layout of the settlement, showing a central monument 'with a stepped structure having a staircase giving access to the top'. (Casal 1966).

With a view to tracing the sea-route between the Indus Valley and Mesopotamia, George Dales explored, in 1960, the coastal areas of Makran from Ras Malan to Jiwani and in the process re-examined the well-known Harappan outpost of Sutkagendor. A noteworthy discovery of this reconnaissance, however, was a Harappan settle-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ment called Sotka Koh (burnt hill) situated about 14 km north of Pasni on the bank of the Shadi Kaur in the foothills of the Talor range (Dales 1962). Like Sutkagendor, during the Harappan period, it must have been nearer the coast approachable by an estuary and served as a port town. A similar coastal site was later identified by Raikes at Balakot near Sonmiani Bay about 72 km north-west of Karachi. We have thus, four coastal sites (Lothal, Balakot, Sotka Koh and Sutkagendor) along no less than 1300 km long seaboard of the Indus Civilization attesting to maritime activities.

In 1959-60, Fairservis, while undertaking a reconnaissance of the Las Bela, about 16 km north of the Welpat plain, on either side of the Porali river valley located, a remarkable site complex named as Edith Shahr, falling into two basic divisions A and B. Of these, Complex A, ascribable to the late Kulli culture, consists of a series of terraced platforms on top of which were brick buildings. Complex B, consisting of a series of stone circles and boxlike structures, is associated with Londo ware (Fairservis 1961). It may be recalled that Beatrice de Cardi had discovered, in the Ornach valley a somewhat similar settlement built of heavy stone masonry, with little trace of mud bricks. This showed signs, in each case, of a higher central mound, 'perhaps a citadel' (de Cardi 1964).

Between 1964-65, George F. Dales undertook deep digging at Mohenjo-daro in the vicinity of the H.R. area. His two borings showed that the earliest occupation of the site began as far deep as 39 ft (11.7 m) below the present surface. At the foot of the HR area he also exposed an embanking and walling, the exact function of which remained indeterminate. His excavation raised afresh the controversial issue of the last massacre at Mohenjo-daro. It may be recalled that, during the 1950-excavation at Mohenjo-daro, Wheeler's cutting (an open cast excavation aided by water pumps) on the western fringe of the Stupa Mound, reached only a depth of 26 ft (7.8 m) when it collapsed, riven by the sub-soil water springs. At that depth, the lower limit of the Granary had been identified and the surface of the underlying occupation layer reached.

In December 1967, the Pakistan Department of Archaeology discovered a pre-Harappan site at Sarai Khola, situated about 2.5 km south-west of Bhir Mound, Taxila, along the Grand Trunk Road. The location of a site with such an assemblage in the Potwar region was not without significance. The site was accordingly excavated for three field-seasons during 1968-72, as a result of which, a fourfold cultural sequence was brought to light. Of these, Period I belonged to the Neolithic; Period II to the pre-Harappan Kot Dijian; Period III which followed the abandonment of the site to the Iron Age cemeteries; and Period IV to the Medieval. The chronological span of Period II was ascribed to 2800-2400 B.C. The Pakistan Directorate of Archaeology has reported the discovery of another pre-Harappan site (of comparable assemblage to that of Sarai Khola) across Tamra Nala in the close vicinity of Sirkap, which is now under excavation.

Meanwhile, A.H. Dani conducted explorations in the Gomal valley during 1967-71 and located several Bronze Age sites, noteworthy amongst which are Gumla and Rehman Dheri. Located in the Gomal plain, on an important northerly route leading from the Indus plain to Baluchistan and beyond, these sites afforded alluring possibilities of an interrelationship with those in the Zhob and Loralai valleys on the one hand, and Argandab and Helmand on the other. In 1971, Dani undertook excavation at Gumla (Dani 1971) where he identified six cultural periods. Of these, Period I was aceramic neolithic; Periods II and III pre-Harappan (respectively Surjangal II and Kot Dijian); Period IV, Harappan; and Periods V and VI, late cemeteries.

An equally important excavation was done in the same year (1970) by M.R. Mughal at Jalilpur, situated about 74 km south-west of Harappa on the left bank of the Ravi, where a sequence of twofold cultural periods was established (Mughal 1973). Of these, Period I showed the use of handmade pottery with terracotta net-sinkers, chert blades and bone points. Period II, which overlapped with the preceding one, showed a ceramic assemblage similar to Kot Diji, Amri I, Sarai Khola II, Gumla II, III, pre-defence levels of Harappa and Kalibangan I. Other distinctive finds were the terracotta female figurines, comparable to those found at Shahr-i Sokhta, Gumla and Sarai Khola. As at Sarai Khola, the Mature phase of the Harappa culture was not represented here.

In the seventies, five more excavations were undertaken with useful results: Allahdino (1973-76), situated close to the junction of Bazar nadi and the Mahir river, less than 16 km from

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the sea and close to the Kohistan; Balakot (1973-76) near Sonmiani, some 88 km north of Karachi; Rehman Dheri (1976-80) nearly 23 km north of D.I. Khan in the Gomal plain; Mehrgarh (1973-82), situated on the right bank of the Bolan river, almost at the foot of the pass, and Lewan and Tarakai Qila (1977-79) located a few km south of Bannu. Of these, Allahdino, excavated by Fairservis (1979), was a Mature Harappan settlement, indicating exploitation of the ecological zone near the sea and holding out possibilities of trade with southern Baluchistan. Balakot, excavated by G.F. Dales (Dales 1981), showed a sequence of twofold cultures, Balakotian (pre-Harappan) and Harappan.

Rehman Dheri, excavated by F.A. Durrani (Durrani 1981), showed an evolving sequence of threefold cultural periods in which Rehman Dheri I seems to have two simultaneous strains of ceramics, viz. east Iranian and Kot Dijian. A noteworthy find of this period was an ivory seal, carved on one side with two mountain-goats and some symbols and on the other with two scorpions and a frog and some symbols. Rehman Dheri II represents the typical Kot Dijian assemblage and Rehman Dheri III an evolved Kot Dijian with long ribbon flakes and typical Harappan designs of interconnecting circles (on a white background) indicating contact with the Indus Civilization. A nearby site called Hisham Dheri indicates a full-fledged Harappan settlement. Mehrgarh, excavated by J.F. Jarrige, gives a unique sequence of seven cultural periods ranging from the aceramic neolithic, through ceramic neolithic (Kile Gul Mohammed II) Chalacolithic (Mundigak and Baluchi Hill cultures) to Amri and Kot Diji. Some of the pottery and other objects from the upper levels of the last period of occupation, viz. Period VII, resemble the artefactual characteristic of the Indus Civilization. A large-sized Harappan settlement at Nowshero, some eight km to the south of Mehrgarh, completes the sequence. Besides, some artefacts resembling the Dashli culture of Afghanistan (*c.* 2000 B.C.) and various sites in southern Turkmenistan have also been obtained from the graves excavated at Mehrgarh. The excavation which is still in progress, adds new dimensions to the origin of Indus Civilization indicating that the social and economic patterns characteristic of the Indus Civilization had roots deep in the early prehistory of the region (Jarrige *et al* 1980). Excavation at Lewan and Tarakai Qila in the Bannu basin, conducted by Raymond and Bridget Allchin, jointly with the Peshawar University, indicated that the former site represented perhaps a factory (industrial) complex as seen by the scatter of stone implements like hammer stones, anvils, ring stones, ground stone axes, microliths and cores, and pits with pottery and terracotta figurines assignable to the Kot Diji and Rehman Dheri II. The latter site seems to have a Harappan occupation, besides the Kot Dijian.

The survey of the 300-mile (480 km approx.) long stretch of the Hakra river in the Cholistan area, between Fort Abbas and Rahim Yar Khan, undertaken by M.R. Mughal during 1974-77 (Mughal 1981) was useful field-work. It supplemented and extended the survey done by Aurel Stein in 1940-41 (above, p.). As a result of this survey, Mughal located as many as 407 sites belonging to different cultural affiliations (Hakra, Jalilpur-related, 32; Early Harappan, Kot Diji-related, 41; Mature Harappan, 166; late Harappan, Cemetery H-related, 72, and Post or non-Harappan P.G. Ware-related, 10). From the location of these sites it is seen that the larger concentration, comprising not less than 310 sites or so, is between Lurewala and Duhienwala Qila. This phenomenon is fully explained by Stein's observation that, anciently, the Sutlej joined the Hakra alternative between Walar and Binjor and between Kudwala and Lurewala, as indicated by paleochannels represented respectively by the Hakra-Branch Canal and the Desert Branch of the Hakra Canal, which would have obviously made the Hakra big enough to sustain a large number of settlements.

Outside the Indo-Pak subcontinent, the excavation at Altyn Tepe in Turkmenia and Shortugai in the Oxus Valley are noteworthy for understanding the overland trade connections of the Indus Civilization. At both these sites, among other objects, typical Indus seals have also been found to confirm the Indus nexus, however tenuous.

The foregoing review of the field-work during the last sixty years brings out the changes taking place in certain paradigms and perspectives relating to the civilization, and underscores the desirability of systematically reviewing and synthesizing new knowledge as it accrues. The views that scholars now hold about the nature and origin of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Indus Civilization are quite different from that expressed four decades ago. Archaeologists are now asking different questions. The present paper discusses some of the aspects and traditional paradigms which need revision.

Changing Perspectives
Distribution and Settlement Pattern

The Indus Civilization is, therefore, no longer confined to the Indus Valley alone; its spread beyond the Indus Valley proper belies Marshall's postulate that the 'Indus Culture, was peculiar to Sind and Punjab and as distinctive of those regions as the Sumerian culture was of Mesopotamia or the Egyptian of the valley of the Nile' (Marshall 1931). However, the phrase Indus Civilization, having gained currency through usage, and justified by the fact that its nuclear area continues to be the Indus region with its elements being recognized widely in the parallel systems of the Indus and the Ghaggar-Hakra is retained as an inclusive term.

Let us now understand the spread of this civilization in this widely-extended area which, forked essentially in the south-east by the Thar Desert, shows different geophysical features. This has an important implication for understanding the different functions of the sites. From the distribution map of the civilization **(fig. 1.3)** it would be apparent that a larger percentage of the sites are located on the parallel systems of the Indus and the Ghaggar-Hakra within the exploitable reach of the flood-plain. Of these, the Indus was an aggrading river, making its bed higher than the surrounding plain. Being fed both by snow and monsoon and having a gradient of 4.8 cm per kilometre in the Sind region, periodic flooding has been an important phenomenon of its regimen. There were at least two periods of inundation: one after the snow-melt in March-April and the other after the south-western monsoon in August. Although both snowfall and the monsoon were variable, they nevertheless provided for the raising of both *Kharif* and *Rabi* crops. The sites in this region, therefore, have one pattern of subsistence economy. There are two other

INDUS CIVILIZATION : DRAINAGE SYSTEM IN NUCLEAR REGION

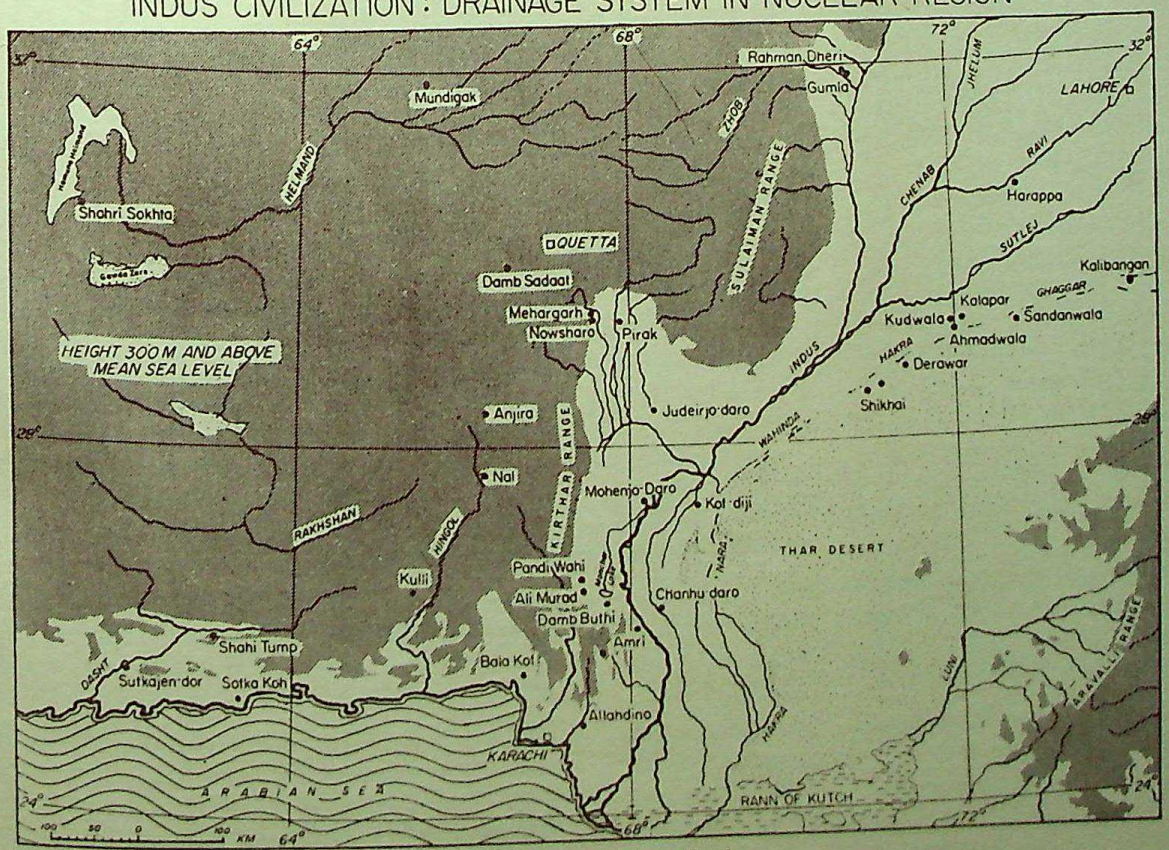


Fig.1.4. Harappan sites in Sind

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

distinct ecological regions from where Harappan sites have been reported: Kachhi plain, a flat expanse of alluvial outwash, located at the foot of the Bolan pass and the lake Manchhar, the repository of spill water from the flood-channels of the Indus, including the western Nara as also the drainage of the hill country. The former is largely inhospitable, and, except for its periphery, is completely dry. The sites are, therefore, located only on its northern and southern ends like Nowsharo, Judeirjo-daro, etc. The latter, with its periodically changing level of filling and emptying, provided excellent arable land for cultivation. There are quite a few sites in this area like Pandi Wahi, Damb Bhuti, Ali Murad. **(fig. 1.4)**.

The third area in the Sind Baluchistan region where Harappan sites have been located is the Makran coast: Sutkagendor, Sotka-Koh and Balakot. These were essentially sea-ports, controlling the coastwise traffic and trade. Each of these sites is located at the outlet of an important valley through which the Makran coast is approached from the Baluchi hinterland: the western-most of these is Dasht Kaur; Shadi Kaur is central and the eastern most is Las Bela composed of alluvium deposited by the Porali, the Hab and the Malir. **(fig. 1.4).**

Closer to the Punjab, the tributaries of the Indus have broad alluvial plains with beds below the general level of the flood-plain and characterized by high ground between them which is unaffected by the floods. The reported

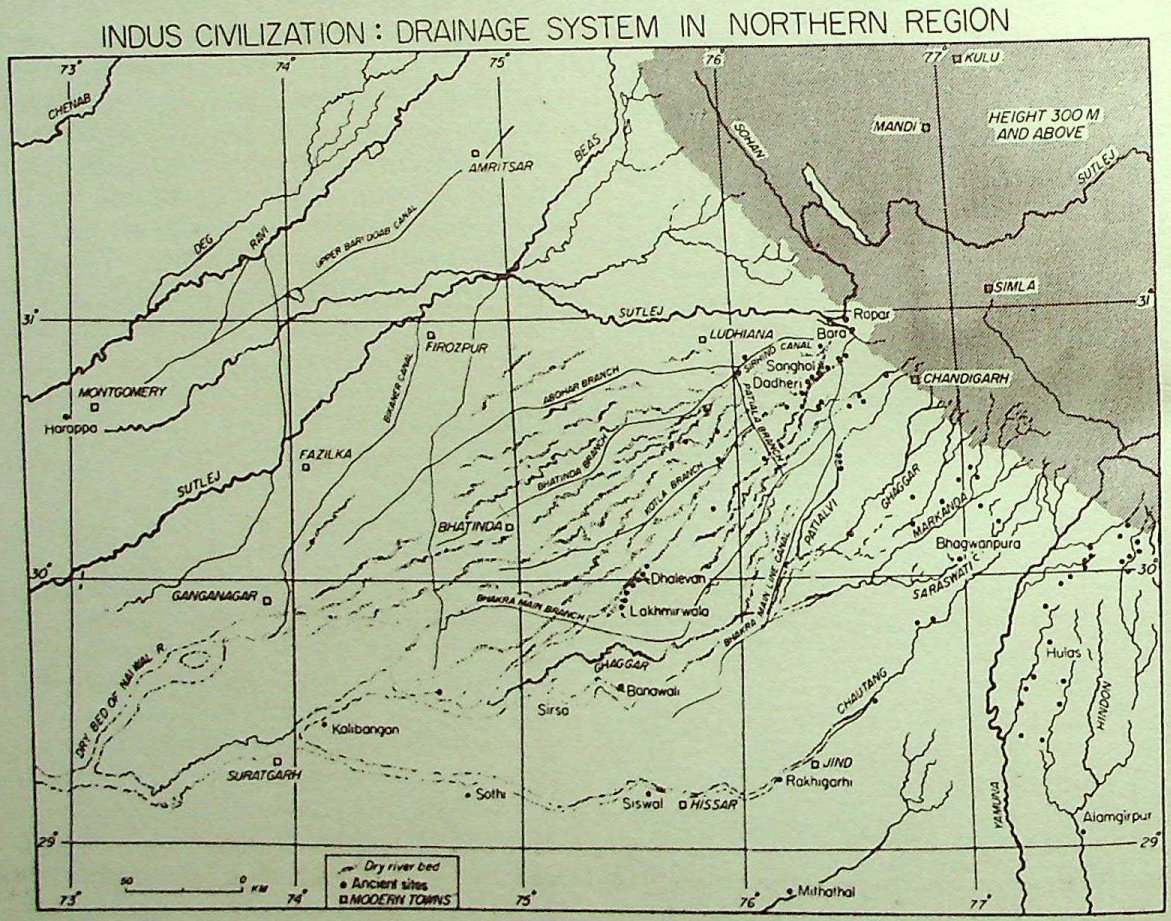


Fig.1.5. Harappan sites in Ghaggar system

Indus sites are Harappa, Chak Purbane Syal and Jalilpur on the Ravi, Manda on the Chenab, and Ropar on the Sutlej. On the basis of land-form studies, great changes have been observed in the courses of the Ravi, Beas and Sutlej. Within the political frontiers of India, no Mature Harappan sites have so far been located in the present-day valleys of either of these rivers with the singular exception of Ropar, situated on the left bank of the Sutlej in the foothills of the Siwaliks. It is

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

reasonable to infer that the channels of both Sutlej and Beas have long been erratic and that enduring settlements with stablized conditions were not attracted to these valleys during Harappan times, unless all traces of such settlements have been washed away by the shifting courses of the rivers. A few Late Harappan settlements have, however, been located in the Sutlej basin. The observation, however, needs confirmation from the Pakistan part of the valleys. As regards Ropar, communication seems to have been through the Ghaggar-Hakra system as indicated by a chain of pre-Harappan and Harappan sites located in the valleys of various seasonal streamlets (*chois*) like Sirhind Nadi, Markanda, Patialvi, including Chautang (ancient Drishadvati), all contributing to the Ghaggar system. **(fig. 1.5).**

The Ghaggar-Hakra was a degrading river with a well cut bed in the alluvium but without a large delta which a river of this size is expected to form. Now largely dried up, this river has seen conspicuous changes. According to some scholars, the river Yamuna at one time flowed westwards through a channel now used by the western Yamuna canal and the Chautang (ancient Drishadvati) and fed the Ghaggar (Raikes 1968). Besides, there is some tangible evidence to indicate that the Sutlej followed an independent course into the Ghaggar-Hakra. The Sutlej is a snow-fed river and carried abundant water to the Hakra through its flow-channels. The added volume of its water could reasonably be held to account for the increased width of its bed westwards of Fort Abbas and for the density of settlements (both Pre-Harappan and Harappan) beyond Lurewala. The Ghaggar along with its tributaries (Sarasvati, Sirhind, Markanda, Patialvi) is fed entirely by the monsoons in the Siwaliks. After its link with the snowfed Sutlej ceased, resulting from 'northering' and 'westering' and the capture of the Yamuna by the Gangetic system, its diminished waters failed to sustain the settlements downstream.

The drying of the river-system resulted in sites of the Pre-Harappan genre in the Chautang (Drishadvati) valley turning into areas of isolation which continued developing on their own lines during the time-span of the Indus Civilization in this region. An impoverished and effete Harappan culture continued on sites in Haryana and Punjab and, the culture of the pre-Harappan genre, which had been staggering in comparative isolation in the region, gave rise to an amalgam of a culture with some distant Harappan and Pre-Harappan traditions, as evidenced at Mitathal IIB, Bara, etc. The attributes of this culture, though becoming commonplace to archaeologists, still await fuller definition.

As regards distribution of the civilization in the southern region, we find that its spread was not uniform on the scale as in Sind, Rajasthan and Punjab. The region shows different geophysical features with small dissected plateaus and scraplands in Kutch and Kathiawad and long seaboard indented by large inlets like the Gulf of Cambay and the Rann of Kutch and tidal flats and saline marshes. The Gujarat plains, located between the marshy coastal zone and the plateau and the mountains, are remarkably flat with sluggish meandering streams.

The drainage network of Kutch, Kathiawad and the rest of Gujarat is unrelated to one another. In Kutch, the rivers flow both to the north and to the south from the Central highland. In Kathiawad, the drainage has a radial pattern with rivers flowing out from the central highland in all directions, developing a dendritic network in the north-western parts of Gujarat. The rivers Banas, Sarasvati and Rupar, flowing into the little Rann of Kutch, have by their coalescing silt, formed an esturine plain, being a favourable ecological factor for Harappan communities to settle. The plain is connected with Kutch and Kathiawad by land routes passing through Bets in the Rann. In south Gujarat, the drainage is characterized by parallel rivers kept apart by well-defined Interfluves. The spread of the civilization was, therefore, conditioned by areas of attraction, viz. coastal flats or along routes of communication or fertile river valleys and esturine plains. These features partly explain the regional diversities in the manifestation of the Indus Civilization: Surkotada, (Kutch) Rojdi, Prabhas Patan and Rangpur (Kathiawad), Lothal and Bhagatrav (southern Gujarat) show divergent traits. The extension of the Harappan influence to the Godavari basin, as reflected by the finds at Daimabad, would be perhaps by only overland route through the Tapti Valley where the Savalda, the so-called Late Harappan and other cognate Chalcolithic cultures, flourished during the first half of the second millennium B.C. **(fig. 1.6)**

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Another aspect of the Indus studies which has recently been engaging the attention of the scholars is to understand the cultural style of the civilization as reflected in the village sites.

HOMOGENEITY

Until recently, the Indus Civilization was thought to be remarkably uniform not only spatially but also in dimension of time. This traditional paradigm, built largely on the data available from Mohenjo-daro and Harappa, now seems to be in a stage of collapse as indicated by stratigraphical and quantitative analysis of the material from other excavated sites. Marcia Fentress' comparative study of the various artefacts from Mohenjo-daro and Harappa has clearly demonstrated the fallacy of the concept of homogeneity (Fentress 1976). The settlement pattern in the widely-extended area of distribution of the civilization (above, p.) shows a variation of cereal crops, wheat and barley at Mohenjo-daro and Harappa, barley at Kalibangan and rice and millet at Lothal, Rangpur and Surkotada (Vishnu Mittre and R. Savithri 1979). Environmental differences have played a significant role in diffusion as also in moulding cultural adaptations. The evidence relating to (i) monumental architecture, including ceremonial centres and layout plan and (ii) religion, ritualism and burial practices presents similar divergent traits at the key sites.

A comparison of the principal excavated sites shows that manifestations of this civilization present divergent traits in different regions in the layout plan of the cities like Mohenjo-daro, Harappa, Sutkagendor, Kalibangan, Lothal and Surkotada. Of these, Mohenjo-daro, Harappa and Kalibangan show an identical layout plan of twin parts of the metropolis with a similar disposition of the citadel *vis-a-vis* the lower city. Perhaps Sutkagendor also followed the same pattern, including the proportion between length and breadth of the citadel, being 2:1, but inadequate excavation at the site does not permit full comparison. The situation at Lothal and Surkotada is

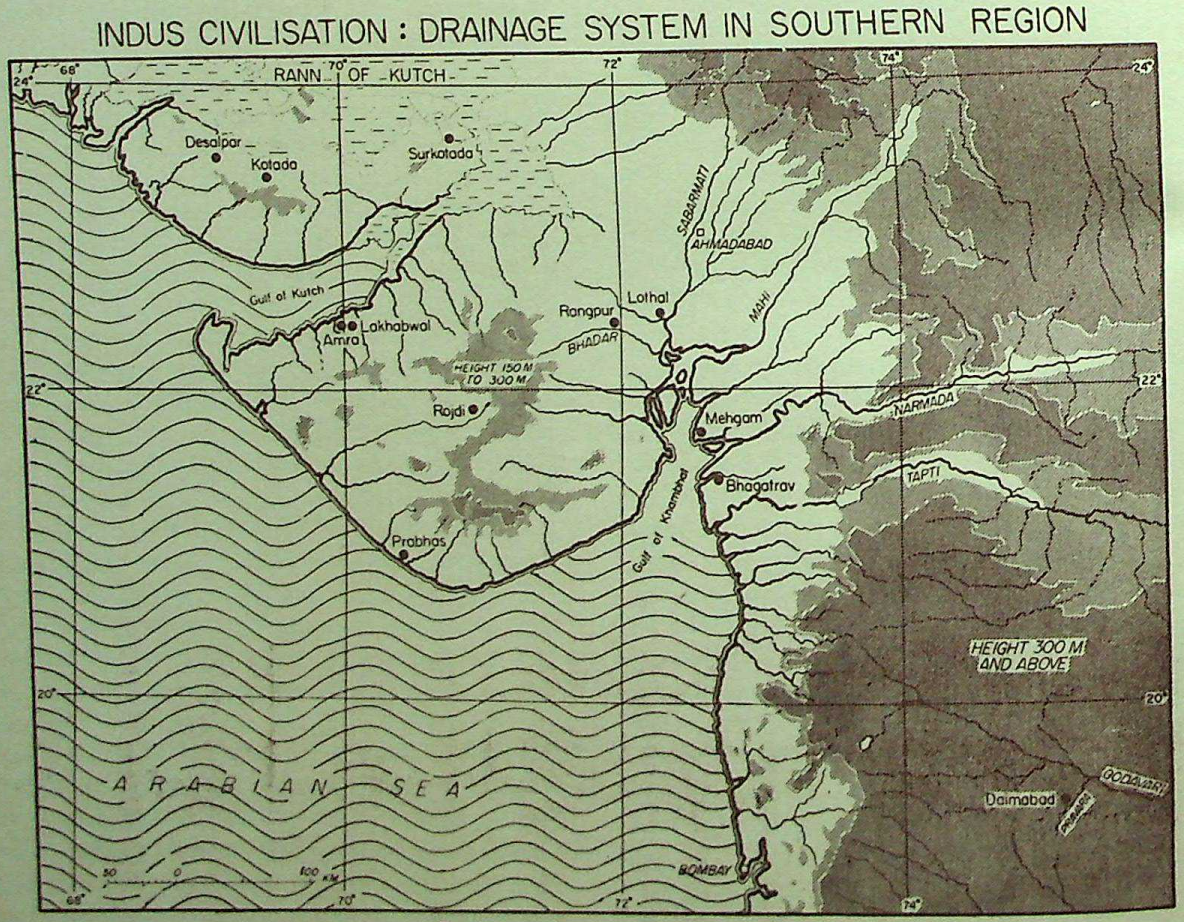


Fig.1.6. Harappan sites in Gujarat

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

quite different. At the former site it has no separate entity, being located in the south-eastern part of the settlement, which is trapezoid on plan and at the latter, it occupies the western half of the settlement in a single fortification complex, which is a rectangle on plan.

At Mohenjo-daro we have sufficient evidence of the functional aspect of the buildings contained in the citadel; the outline of the fortification complex including the gateways, etc., is sadly missing. At Harappa, the position is reverse: we have full details of the fortification of the citadel but no intelligible plans of the buildings enclosed by it. Notwithstanding this situation, largely arising out of differential digging, the location of the so-called granary at both these sites (within the citadel at Mohenjo-daro and outside of it at Harappa within a hundred yards of the river-bed) does point to divergent planning. At Kalibangan the citadel shows a bipartite plan with not less than six mudbrick platforms in the southern half and the residential annexe (perhaps of the elite) in the northern. Some of these platforms carried ritual structures indicated by rows of fire-altars, wells, sacrificial-pit, etc. Separate mud-brick platforms unintegrated with the fortification-wall are not met with at Mohenjo-daro and Harappa as also the fire-altars. Again, the 'lower city' at Kalibangan has been found to be fortified, a feature not so far attested to at Mohenjo-daro or Harappa.

Coming to the traits of religion, ritualism, etc., our information on this complex problem is based largely on seals, terracotta female figurines with elaborate head-dresses, a few stone images and aniconic objects, all commonly known at Mohenjo-daro and Harappa. Amongst these objects, seals alone are found throughout the area of spread of this civilization. Some of these according to Pupul Jayakar may have served ritualistic purpose (Pupul Jayakar 1981); but there is no uniformity in their occurrence on the sites. Excepting two lone examples from Banawali, no female terracotta figurines of the mother goddess with an elaborate head-dress have been found at any other excavated site in India. On the other hand, there is convincing evidence at Kalibangan of some sort of a ritual connected with 'fire-altars'. A row of five 'fire-altars' atop a platform in the southern half of the citadel. Similar 'fire altars' have also been attested to individually in many houses in the lower city. Besides, an exclusive structure with 'fire altars' was found to the east of the 'lower city' outside the fortification. No fire altars have so far been reported from Harappa or Mohenjo-daro. Although definitive evidence about the religion of the Indus Civilization still eludes us, it is reasonable to argue that from available evidence, it would appear that the religious beliefs and practices of the Indus people varied from region to region.

Divergent traits are present in burial practices as well. Among the sites under discussion, cemeteries have been located at Harappa, Kalibangan, Lothal and Surkotada. At Harappa, the cemetery (Cemetery R-37) was located to the south-west of the citadel and contained burials showing extended articulated inhumation with pottery and grave goods placed in rectangular graves. Within the citadel area were also found some post-cremation burials the exact significance of which remains unascertained. At Kalibangan, the cemetery was located to the west-south-west of the citadel and contained three types of burials with mutually exclusive areas for two types: (i) extended inhumation in rectangular or oval graves, containing pottery and other grave-goods; (ii) pot-burial in a circular pit, containing, besides the central urn, other pots and grave-goods like beads, etc.; and (iii) pottery deposit in rectangular or oval graves. The last two modes were unassociated with skeletal remains. At Surkotada, the cemetery was located to the north-north-west of the settlement and contained (so far encountered) pot burials covered by a low cairn and a capstone. At Lothal, the cemetery was located to the west of the settlement and contained two types of burials, both of the extended inhumation variety. While one type contained, besides the grave goods, a single skeleton, the other contained two skeletons buried together. There is thus no uniformity either in the location of the cemetery *vis-a-vis* the citadel or the lower city or in the burial practices followed, the extended inhumation being common at Harappa, Kalibangan and Lothal. The monolith of the Indus Civilization in terms of homogeneity thus stands broken up.

CLIMATE

Aurel Stein had postulated a period of desiccation in Baluchistan resulting from change in climate after the protohistoric period (Stein 1931). His

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

inference for comparatively wetter conditions during pre-Harappan and Harappan times (third millennium B.C.) was based on three factors: (i) presence of *gabarbands* for control of surface water; (ii) location and number of ancient mounds in contrast to present day settlements; and (iii) depth of settlements.

Marshall extended this postulate of a more congenial climate than that obtaining today to the Indus basin, using the following evidence: (i) almost universal use of baked bricks requiring plentiful fuel; (ii) presence of an elaborate drainage system to dispose off storm water; and (iii) the occurrence of marsh or jungle-animals (tiger, buffalo, rhinoceros, elephant) on seals. At the same time, Marshall was aware of the pitfalls of this postulate and had observed:

> Independently of these considerations we must also not forget that in neither Egypt nor Mesopotamia is there any evidence to show that during the Chalcolithic Age the rainfall was substantially heavier than it is at present. On the contrary, the universal use of sun-dried bricks in exposed buildings is proof positive that the climate has altered little in these countries during the last five or six thousand years. We shall do well, therefore, to hesitate before assuming that the pluvial theory explains the changes that have taken place in Sind since the Chalcolithic Age. (Marshall 1931).

This change of climate theory was questioned by Raikes (Raikes and Dyson 1961; Raikes 1967) who held the view that climate is a worldwide phenomenon admitting no geographical boundaries other than those inherent in itself. It follows, therefore, that secular changes must be world wide. He examined the evidence from hydrological, zoological, botanical, archaeological and architectural points of view and found the hypothesis of change of climate lacking in conviction. He averred that most sites of the Indus Civilization were in the flood-plain environment where rainfall was of minimal importance and could have prospered on zero rainfall with or without artificial irrigation. Wheeler, who in the earlier edition of his book on *Indus Civilization* had accepted a certain degree of climatic change, modified his views in the third edition (Wheeler 1968): 'The plea that at Mohenjo-daro and Harappa, the normal use of baked bricks rather than mud-bricks implies a wet climate cannot stand upon its own feet.'

Baked bricks, it may be recalled, were certainly not used universally at all Indus sites. Their use at Kalibangan and Lothal was very restricted. At Mohenjo-daro there was perhaps a special inducement to use baked bricks because of recurring floods. Added to this data is the fact that both cotton and barley, which thrive in arid conditions, were grown here. From the faunal point of view also, the flood-plain with a shallow water table could have provided a typical jungle habitat for animals like tiger, rhinoceros, etc. This postulate of no-change of climate is at variance with the findings of pollen, analytical and meteorological studies, to which attention may now be drawn.

Recent pollen analytical studies of salt-lake deposits in the area centering on the Rajasthan desert (Sambhar, Didwana and Lunkaransar) reflect on the nature of the climate during the Harappan period (Singh 1971). The environmental sequence built up from pollen analysis has been grouped into six phases, of which phase IV, ascribable to *circa* 3000–1000 B.C. covers the period of the Indus Civilization, including its antecedent and subsequent phases. This phase is sub-divided into sub-phases IV A (c. 3000-1800 B.C.), IV B (c. 1800-1500 B.C.), and IV C (c. 1500-1000 B.C.). Of these, IV A shows wetter conditions, IV B, drier conditions and IV C, reversal to relatively weak wetter conditions. The palaeoecological picture of sub-phase IV A indicates an annual rainfall of at least 50 cm in excess of the present-day average in the arid belt of Rajasthan. The onset of aridity in sub-phase IV B is reported to have resulted in the weakening of the Indus Civilization in the arid and semi-arid regions of Sind and Rajasthan without affecting the peripheral regions of Gujarat and the Himalayan foothills **(fig. 1.7)**.

The hypothesis of a wetter climate during the Harappan period is now supported by meteorological studies which indicate (Ramaswamy 1968) that, during *circa* 2000-500 B.C., deep troughs in the upper westerlies must have caused frequent active monsoon conditions over the entire Indus valley. These conclusions are supported by the presence of considerable reserves of ground water in the arid region of western Rajasthan, the upper age limit of which is dated, by the radiocarbon method, to 5000 B.P.

From the foregoing, it is apparent that only one pollen diagram is available for us to interpret the evidence of climatic changes during the past 5000 years. The evidence for the Indus Civilization is an extrapolation of that obtained from Rajasthan and has to be used with caution. This is

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

necessary since, for the past 9000 years, world-wide climate has been essentially the same as today and 'evidence of climate change must be interpreted in terms of either extreme but short-term examples of the built-in variability of rainfall or drainage changes' (Raikes 1967). In fact, a recent environmental analysis, based on the re-interpretation of the Rajasthan pollen diagram in the background of desert vegetation reveals an arid climate during the period 3000-2000 B.C. (Vishnu Mittre 1978). Furthermore, how far aridity is responsible for the decline of the Indus Civilization, is still only a matter of conjecture. Tectonic uplifts in the Sind and the changing courses of the rivers like the Sutlej, Yamuna, etc., must have had a major role to play.

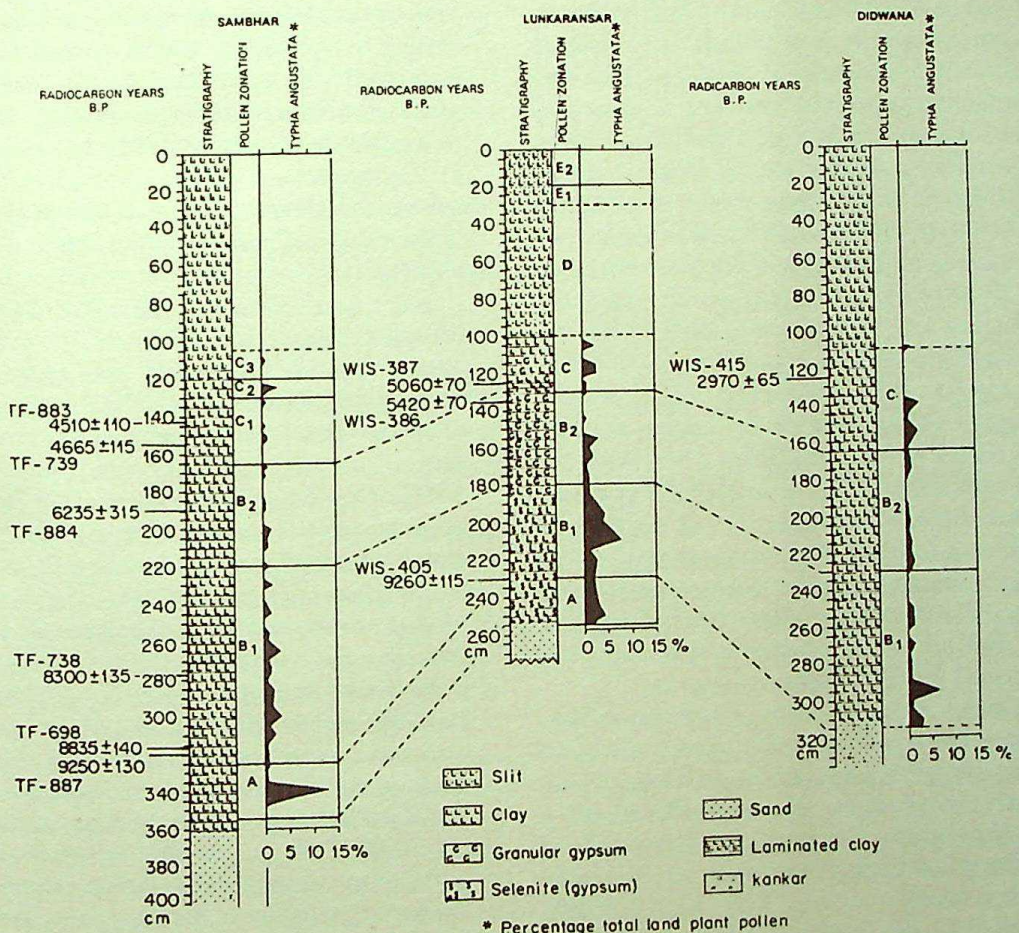


Fig.1.7. Climatic chart: Gurdip Singh

ORIGINS

For nearly a quarter of a century after its discovery, the Indus Civilization was still thought to have sprung into being suddenly. Subsequent research has, however, indicated various possibilities or alternatives for the origin of the Indus Civilization, without being conclusive on any one of them. Among these views, the more often referred to are those of Wheeler and Fairservis. According to the former, 'the Indus Civilization may, in origin, best be visualized as the sudden offspring of opportunity and genius ... the idea of civilization came to the land of the Indus from the land of the Twin Rivers' (Wheeler 1968). Fairservis on the other hand affirms that the process which created the civilization on the Indus is logically the result of processes already underway in the borderland (Fairservis 1971).

A clear analysis of the Indus and Mesopotamian civilizations would indicate that the basic differences which preclude the possibility of any direct colonization of the former by the latter (Gupta and Asthana 1978). At the same time, it

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

must be admitted that the dissimilarities are in the detailed performance of the basic concurrences such as the attributes of the city itself, widespread trade, well-organized agriculture, fertile river-valleys full of possibilities, specialist craft and ceremonial centres. Considering the nature of the land in between the two regions — barren mountains with scattered settlements in sheltered valleys — it is reasonable to argue that any Mesopotamian-generated influence or ideas was bound to change before reaching the Indus plain. The concept of a ziggurat may thus have become citadel through intermediate stages of the Edith Shahr complex, sites in the Ornach valley showing a high central mound and Nindowari (district Kalat), showing a centrally-located stepped tower like structure with a staircase leading to the top which may have been a temple (Wheeler 1968).

The other contention would postulate prosperous peasant village economies leading through various stages to rich and urban ones, after becoming sufficiently skilled to exploit the potential of the flood plains. A close study of the Baluchi hill cultures and other cultures antecedent to the Harappan, would certainly reveal a meaningful pattern of a somewhat uniform level of material culture. But the catalytic agent or the motivating factor to take the next vital step is lacking.

It has been found that, at each of the excavated sites where Harappan occupation has been found overlying the pre-Harappan, the settlement of the Harappan period started almost suddenly with a Mature expression. The form or cultural style of the civilization thus does not seem to have been developed locally on those sites, be it Kot Diji, Harappa, Balakot, Gumla or Kalibangan. Some of these sites do contain material that anticipates the typical traits of the Indus Civilization and as such have been labelled early Indus by Mughal, as belonging to the formative phase of the Indus Civilization (Mughal 1970 and 1973). It is equally clear that this development could not have taken place in complete isolation.

Recent excavations at Tepe Yahya and Shahr-i Sokhta, demonstrating full-scale development of partly literate and economically demanding complex societies on the Indo-Iranian borderlands at the end of the fourth millennium B.C. point towards eastern Iran as the homeland of the formative influence on the Indus Civilization. The excavations have provided a synchronism between proto-Elamite tablets, Nal Ware, terracotta bulls, etc., with Tepe Yahya yielding a Persian Gulf seal, a seal impression with an unmistakable Indus script on a potsherd and Mesopotamian ceramics. The presence of a late fourth and early third millennium protoliterate community in south-eastern Iran may, in turn, have provided the stimulus for the system of writing in the Indus Civilization and played an important role in generating the process which gave rise later, to the Harappan Civilization. According to Lamberg-Karlovsky, trade was one of the important entities motivating the rise of urban complexes in Mesopotamia, the Iranian highlands and the Indus (Lamberg-Karlovsky 1972).

The role of the idea and stimulus diffusion from Mesopotamia, Iran, Seistan, etc., combined with *genius loci* has to be fully recognized. Wheeler had even postulated a traffic in basic ideas devoid of all material inter-resemblance—ideas of civilization, writing, seals, citadel, etc. (Wheeler 1966). One could argue for a catalytic influence of a selective qualified and transient character which spurred on the synoecism. What is urgent to the solution of the problem is to study the traits of the loosely-termed pre-Harappan communities in the various regions (eastern Iran, Baluchistan and the Indus flood-plain) and to establish points of interrelationship and lines of communication between each. For, it is at this stage of development that we have to recognize the identifiable stimuli from Mesopotamia, Iran, etc. Meanwhile, the current excavation at Mehrgarh, where a cultural sequence right from the aceramic neolithic to the Harappan (Nowshero), has been established, promises useful evidence on the origin of the Indus Civilization (Gupta 1979).

Trade and Contacts

It is widely known that Sind is devoid of useful minerals except salt, with the result that subsistence-related materials like copper, tin, gold silver, limestone, alabaster, basalt, granite, marble, slate, steatite, gypsum, bitumen, lapis lazuli, cornelian and other semi-precious stones like jade, turquoise, amazonite, etc., had to be imported—and some sources were at a long distance.

The origins of these materials have already been indicated by Marshall (Marshall 1931) and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Wheeler (Wheeler 1968). Trade links have thus been indicated with Central Asia, Afghanistan, north-eastern Iran, Baluchistan, Rajasthan, Gujarat, Punjab and south India. The occurrence of seals of Indus style, etched cornelian beads, kidney-shaped inlay of bone, cubed dice, pottery, bearing knobs on barbotine, pyxis of greenish-grey stone, metal spiral pins at various sites in Mesopotamia and India has also been discussed by scholars as evidence of trade-contacts between the Indus Civilization and contemporary Mesopotamia and Elam. Lamberg-Karlovsky, however, argues that such material may have resulted from indirect contact trade (Lamberg-Karlovsky 1972). Attention may now be drawn to other evidence on the subject.

Recent excavation at Shortugai in Oxus basin has revealed the existence of a Harappan colony for carrying out trade in lapis lazuli. Apart from typical Harappan pottery, a seal bearing the script has also been found to confirm the trading character of the colony **(fig. 1.8)**.

In 1954, the decipherment of certain Sumerian and Akkadian documents which refer to a land called Dilmun added further dimensions to the trade between Mesopotamia and the Indus Valley (Oppenheim 1954). Dilmun was considered the eternal home of the immortal ancestor of mankind. In some other tablets found at Nippur, Dilmun is referred to as the place where the sun rises. It may be recalled that Sumerian and Babylonian texts use three terms for the Persian Gulf: Lower Sea, Bitter Sea, Sea of the Rising Sun .(Bibby 1969). The earliest reference to Dilmun was by Ur Nanshe, king of Lagash (*c.* 2450 B.C.): 'The ships of Dilmun from the lands brought me wood as tribute.' Sargon of Agade (2370-2284 B.C.) mentions that ships from Dilmun, Magan and Meluhha were docked at his capital, Agade. With the internal break-up of the Akkadian political system, trade with the Indus seems to have dwindled only to be revived during the latter part of Ur III (Ibbi Sin's reign), as attested by reference to trade in cornelian, wood and gold from Meluhha. Textual evidence shows that the Indus-Mesopotamian contact continued through the Larsa period.

Dilmun has been identified with Bahrain (Cornwall 1946). The reason for its importance on the trade-route was its being a watering point. It was only here that fresh water could be obtained in quantity — water which the God Enki had caused to spring forth in Dilmun (Bibby 1969). Meluhha is identified with the Indus Valley and Magan with Oman or Makran (Hausman 1973). Kramer (1963, 1964) and Romila Thapar (1975), however, do not agree with these identifications and, instead, identify Dilmun with the Indus Valley. Danish archaeologists, P.V. Glob and T.G. Bibby, have, through their excavation in Bahrain and Failaka islands, established that this region served as an intermediary or entrepot for trade between Indus and Mesopotamia. On the Bahrain island, the type site Barbar, provides a chronological sequence from 2700 to 1800 B.C. Artefact association with the Indus Civilization include: (i) Persian Gulf seals (identical with those found at Lothal and Mohenjo-daro including one from Failaka), bearing Indus scripts; (ii) cornelian beads; and (iii) Harappan weights.

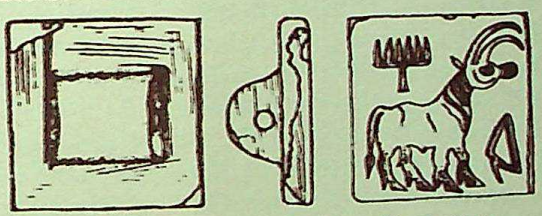


Fig.1.8. The Harappan seal from Shortughai

CHRONOLOGY

The problem of chronology of this far-flung civilization is an involved one and contains some unknown factors like the umplumbed depths of Mohenjo-daro and the time lag between the origin and growth of the civilization in the nuclear area and the peripheral areas to the east and south.

Marshall whose excavation at Mohenjo-daro constitutes substantive work on the subject, had suggested that the occupation at Mohenjo-daro fell approximately between 3250 and 2750 B.C. — a period of five hundred years, that is two generations apiece for each of the seven successive strata brought to light without counting those that are still submerged. He had affirmed that this short period of 500 years must not, of course, be supposed to cover the whole rise and fall of the Indus Civilization and had accordingly postulated a thousand years for a period of antecedent growth (Marshall 1931).

Mackay who undertook further excavation at Mohenjo-daro between 1927-31, assigned the lowest attainable levels of Mohenjo-daro to about 2800 B.C. and the uppermost to 2500 B.C. allow-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ing some 300 years to the life-span of Mohenjo-daro (Mackay 1938). Vats, who excavated Harappa during 1921-31, felt that the lowest levels of Harappa were earlier than those attainable at Mohenjo-daro and had suggested a time bracket *circa* 3500-2500 B.C., basing his argument primarily on the occurrence of tiny seals and sealings of an archaic type below stratum IV which, according to him 'are peculiar to Harappa and the like of which have not been found hitherto at Mohenjo-daro. From Stratum IV downwards the (Harappa) mound may be said to be earlier than Mohenjo-daro'.

This position continued till 1946 when Wheeler undertook further excavation of Harappa. After examining the available evidence he postulated that the millennium 2500-1500 B.C. was a possible inclusive date for the Indus Civilization (Wheeler 1947), without prejudice to the unplumbed depths of Mohenjo-daro. In this computation the terminal date was conditioned largely by a subjective approach, for 1500 B.C. is the conventional date for the Aryan incursion into India, and Wheeler was of the view that the end of the Indus Civilization was brought about by Aryan invasion. Wheeler, however, supported his argument by the occurrence of a seal of Indian origin found in the Kassite levels at Ur, without discounting the possibility of its survival in later levels, especially when the bulk of evidence relating to the seals ascribed to a dated context, pointed to Sargonid and Larsa periods. He, however, corrected himself later and proposed 1700 B.C. as the terminal date of the civilization (Wheeler 1968). Subsequently, various scholars worked on the comparative study of the Indus material and suggested some modification to this date (During Caspers 1965, 70, 71, 72; Durrani 1964; Chakrabarti 1967).

After the discovery of radiocarbon dating which came as a godsend to archaeology, many samples from the Harappan sites were dated by this method. On an objective analysis of the ^{14}C determinations from various sites, Agrawal proposed a maximum date-bracket of 2300-1750 B.C. for the total time-spread of the Indus Civilization (Agrawal 1964). This shorter chronology, especially its lower end, was not acceptable to many scholars **(fig. 1:3)**. Meanwhile during the twenty-five years or so of the usage of the radiocarbon technique, it was noticed that the method was not without disparities which became serious in the earlier part of the second millennium B.C. and increase steadily backwards to the fourth millennium B.C. To overcome these disparities, calibration curves were presented by various laboratories, including Arizona, Pennsylvania, and Uppsala. Although there is good agreement on the average, no conclusive decision is available as to which curve expresses true calendric dates. The more current calibration curve is, however, the MASCA (Elizabeth Ralph *et al* 1979).

Meanwhile, Dales worked up the correction factors with respect to many sites in South Asia, including Kot Diji, Amri, Mohenjo-daro, Harappa, Kalibangan, Lothal and Rojdi and came to the conclusion that the adjusted dates for the Indus Civilization (*circa* 2900-1900 B.C.) bring the Indus chronology directly in line with the historical chronology of Mesopotamia (Dales 1973).

It must, however, be emphasized that this bracket cannot be applied *ad hoc* to fit all Indus towns and villages at various locations. A sloping horizon has to be assumed to allow for the diffusion of the Indus Civilization from the nuclear to the peripheral areas. The duration of these phases would thus vary at different sites in different regions; the sites in Haryana and Gujarat are a point in consideration. Brunswig, critically examined the evidence relating to artefact association showing contacts with Mesopotamia and Persian Gulf (Barbar-Bahrain, Failaka) and the radiocarbon dates of the five Harappan sites (Kot Diji, Mohenjo-daro, Kalibangan, Lothal and Rojdi). This evidence when seen in the context of the calibration factors, suggested (Brunswig 1975) a three-period framework for the Indus Civilization: the Formative Phase, 2800-2500 B.C.; the Mature Phase, 2500-2200 B.C.; and the Late Phase, 2200-2000 B.C. According to him, 'after this time the Harappa Culture, as a distinct entity, gradually ceased to exist.'

Decline

It was formerly held that the dissolution of the Indus Civilization was abrupt and catastrophic. Various causes have been adduced for its weakening and ultimate collapse: climate, disease (probably malaria), invasion, disturbed and insecure conditions, intermittent flooding, wearing out of the landscape, etc. The thesis of invasion by the Indo-Aryans, supported by the so-called macabre scene of massacre at

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Mohenjo-daro has proved (Wheeler 1947, 1968) to be fallacious in the light of archaeological and anthropological evidence. It would, however, be conceded that for a wide spread civilization as that of the Indus, neither a uniform and nor a single causative factor for its decay need be postulated. Current research has shown that the decline of the Indus Civilization was irregular and was caused by differnt factors in different areas.

It is widely known that environmental factors, including the behaviour of the river, climate and accessibility of natural resources were largely responsible for the growth into maturity and expansion of the Indus Civilization. Paradoxically, it is those very factors in the multi-causal framework which become responsible for the weakening and collapse of the civilization. For the Indus Valley, the principal factor which seems to have contributed to the impending fall was the impact of frequent prolonged flooding. Tectonic uplifts across the Indus Valley, repeated intermittently, resulted in the ponding of the area north of Sehwan, turning Mohenjo-daro into an island, making its citizens to battle again and again with such dangers and to live in ever-present dread of flood. This also resulted in the rise of the water-table in the area with its concomitant effects on the salinity of the soil. Lambrick, however, disputes the theory of tectonic uplifts resulting in floods but instead believes that the final ruin and extinction of Mohenjo-daro was due to an avulsion and major change of course by the Indus, considerably upstream of the city, which made the river flow thirty miles (48 km) east, close to the flank of the Khairpur hills. Since the inundation spill became inaccessible to Mohenjo-daro he argues, the city starved of water, began to deteriorate (Lambrick 1967). Lambrick, however, was candid enough to agree that his postulate was based on circumstantial evidence and that a re-examination of this complex problem is called for. Marshall had long back stated that, if the river Indus was a beneficient giver, it might equally become the author of desolation and ruin (Marshall 1931).

For the coastal area, the causative factor perhaps was the eustatic phenomena which took place along the northern margin of the Arabian Sea. This resulted in some old ports, on the Makran and Kutch-Kathiawad coasts (Sutkagendor, Sotka-Koh, Balakot, Lothal), being land bound and thus ineffective for trade.

In Punjab (including the Bahawalpur region) and Rajasthan, geomorphic changes occurred and resulted in: (i) change in the course of the Sutlej, Beas and Ravi; and (ii) the river Ghaggar (the Ghaggar-Hakra system) drying up with the Yamuna shifting to the Gangetic system and the Sutlej to the Indus system. These factors seem largely responsible for the impoverishment of the civilization with a decline in civic standards in this area and collapse of the administrative structures. The destruction of forests and intensive grazing in the Himalayan foothills led to erosion and to the wandering of water channels due to the raising of their beds through the deposition of detrities, typified by the Ambala streams, Markanda, Patialvi, etc.

It is reasonable to argue that, under such circumstances, long distance and internal trade in resource material would have been badly disturbed and the surplus wealth supporting such trade would have considerably declined—thus impoverishing settlements of the far-flung civilization in cultural content.

In the context of the environmental syndrome, it would be seen that the phenomena of pluviality, eustasy and aridity produced different reactions in different physiographic regions. This would perhaps explain the survival and variability of the civilization in regions like Gujarat, Haryana, Punjab and the contiguous areas of Uttar Pradesh in the first half of the second millennium B.C. (uncalibrated dates). Here, a process of cultural transformation and adaptation to new ecological condtions was taking place, the pattern and the rates of change being again different in each region.

METHODS

Though, by the twenties of the present century, Indian archaeology had come of age, archaeological techniques employed for field work were grossly inadequate. It is a fact that in the excavations at Mohenjo-daro and Harappa, modern scientific methods of stratification and seriation, pioneered two decades earlier in Britain by Pitt-Rivers (1827-1900), were not applied. In fact, the system of recording objects and structures was in relation to a fixed bench-level adjusted with the mean sea-level mark 480 km away. The implication thus was that all excavated objects and structures at the same level below or above the datum line were contemporary with one another.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Piggott, had criticized Mackay's method of recording his excavation (Piggott 1948), while Lambrick, felt that the work of Mackay has been grieviously misrepresented and traduced apparently through inadvertence (Lambrick 1970). Wheeler had called this method incredible and a very parody of scientific technique. At the same time, he recognized the merit of the excavation without sparing the lash on the methods adopted (Wheeler 1954):

> The primary marvel of the great Indus city is not that it did (or did not) develop in such and such a fashion between, let us say, 2500 and 1500 B.C. but that it existed at all in the remarkable form that extensive, if disproportionately summary, excavation has revealed to us. Its house-walls, towering accumulatively above our heads, its long straight streets, its lanes, its elaborate drainage system, its citadel—these and other things in bulk—recreate a whole phase of human society even though in detail they fail to analyse for us. Analysis—by careful vertical digging—should, of course, have accompanied all this summary horizontal clearance; but there can be no question that Mohenjo-daro takes its place as the representative of one of the great civilizations of the ancient world, in some measure by virtue of the crimes of its explorers.

The above passage underlines Wheeler's doctrine of the precedence of vertical digging over horizontal excavation and the insistence on analytical study of the finds for cultural dynamics. Wheeler, however, realized the limitations of rigid stratigraphical digging. Talking about what matters in archaeology he urged (Wheeler 1966) us not make a fetish of the Pitt Rivers tradition, for his methods, undiluted, will not as a rule meet our problem, especially when we are confronted with the relics of a great civilization. Wheeler felt that Pitt Rivers's methods were right only in the context of small sites representing relatively unevalued cultures and that selective stratification on large-scale work could also produce what matters. In that strain he admitted that excavations at Mohenjo-daro:

> showed Indus Civilization to us, certainly not have it delivered us. . . . They added a chapter to the history of civilization, whereas we, the grandchildren of Pitt Rivers, might have only added a paragraph to a catalogue of cultures — they gave us what primarily *mattered*.

The excavations at Balakot, Mehrgarh, Gumla, Rehmandheri, Kalibangan, Surkotada and Lothal, illustrate this approach. It is commonplace knowledge that archaeology is now becoming increasingly dependent upon sciences with the result that interdisciplinary research has begun in various fields. A recent addition to the large range of applied sciences is hydrology which now claims an important place in the studies on Indus Civilization (Raikes 1967). Notwithstanding this, encouraging progress has been made in absolute dating (radiocarbon and thermoluminiscent), palaeobotanical and ecological studies, mineral and metal analysis

REFERENCES

Barret, D. 1913. *The Antiquities of India.*

Bibby, T. Geoffrey. 1958 a. The Ancient Indian Style Seals from Bahrain. *Antiquity.* Vol. 32;; 243-4.

———. 1958 b. Excavating a Bahrain Citadal of 5000 years ago, and Seal-links with Ur and Mohenjo-daro. *Illustrated London News.* 14 January.

———. 1969. *Looking for Dilmun.* New York.

Brunswig, Robert H. 1975. Radiocarbon Dating and the Indus Civilization: Calibration and Chronology. *East and West.* Vol. 25, 1-2; 111-45.

Casal, J.M. 1964 a. *Fauilles d'Amri.* Paris.

———. 1964 b. Fresh Digging at Amri. *Pakistan Archaeology.* Vol. 1; 57-65.

———. 1966. Nindowari, a Chalcolithic Site in South Baluchistan. *Pakistan Archaeology.* Vol. 3; 10-21.

Chakrabarti, Dilip K. 1967/68. Harappan Chronology. *Journal of Ancient Indian History.* Vol. 1, 1-2; 78-82.

Cornwall, Peter, B. 1946. On the Location of Dilmun. *Bulletin of the American School of Oriental Research.* No. 102; 3-11.

Cunningham, Alexander. 1875. *Archaeological Survey of India Report for the year 1872-73.* Vol. V; 105-8.

Dales, George F. 1962 a. The Role of Natural Forces in the Ancient Indus Valley and Baluchistan. *Anthropological Papers.* University of Utah. Vol. 62; 30-40.

———. 1962 b. Harappan Outposts on the Makran Coast. *Antiquity.* Vol. 36; 86-92.

———. 1962 c. A search for ancient Sea-Ports. *Expedition.* Vol. 4, 2; 2-10.

———. 1973. Archaeological and Radio-carbon Chronologies for Prehistoric South Asia. *In South Asian Archaeology Norman Hanmond ed.* London. 157-70.

———. 1981 Reflections on Four Years of Excavation at Balakot. *In Indus Civilization: New Perspectives.* A.H. Dani ed. (Islamabad). 25 bb.

Dani, A.H. 1970/71. Excavation in the Gomal Valley. *Ancient Pakistan.* Vol.5; 1-77.

———. 1975. Origins of the Bronze Age Cultures in the Indus Basin: A Geographic Perspective. *Expedition.* Vol.17, 2; 12-18.

Daniel, Glyn 1968. *The First Civilizations: The Archaeology of their Origin.* Harmondsworth.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

de Cardi, Beatrice. 1951 A New Prehistoric Ware from Baluchistan. *Iraq*. Vol.13, 2; 63-75.

———. 1959. New Wares and Fresh Problems from Baluchistan. *Antiquity*. Vol. 33, 129; 15-24.

———. 1964. British Expedition to Kalat, 1948 and 1957. *Pakistan Archaeology*. No.1; 20.

———. 1965. Excavations and Reconnaissance in Kalat, West Pakistan. *Pakistan Archaeolooy*. Vol.2; 86-182.

Dikshit, M.G. 1957. New evidence of Harappan culture in Saurashtra. VVRB. Vol. 2; 3-35.

During-Caspers, E.C.L. 1965. Further Evidence for Cultural Relations between India, Baluchistan, Iran and Mesopotamia in Early Dynastic Times. *Journal of Near Eastern Studies*. Vol.24; 53-6.

———. 1970. A Note on the Carved Stone Vases and Incised Grey Ware. *Anthropological Papers of the American Museum of Natural History*. Vol.51, 3; 319-25.

———. 1971. New Archaeological Evidence for Maritime Trade in Persian Gulf during the Late Protoliterate period. *East and West*. Vol.21, 1-2; 21-44.

———. 1972. Etched Carnelian Beads. *Bulletin of the Institute of Archaeology, University of London*. No.10; 83-98.

Durrani, Farzand A. 1964. Stone Vases: an Evidence of Connection between Mesopotamia and the Indus Valley. *Ancient Pakistan*. Vol.1; 51-96.

Fairservis, Walter A.Jr. 1956. Excavation in the Quetta Valley, West Pakistan. *Anthropological Papers of the American Museum of Natural History*. Vol.45, 2.

———. 1959. Archaeological Surveys in the Zhob and Loralai Districts, West Pakistan. *Anthropological Papers of the American Museum of Natural History*. Vol.47, 2.

———. 1961 a. Archaeological Studies of the Seistan Basin of south-western Afghanistan and Eastern Iran. *Anthropological Papers of the American Museum of Natural History*. Vol.48, 1.

———. 1961 b. The Harappan Civilization: New evidence and More theory. *Novitates*. No.2055.

———. 1971. *The Roots of Ancient India*. New York.

Fentress, Marcia 1976. Resource Access, Exchange Systems and Regional Interaction in the Indus Valley: An investigation of archaeological variability at Harappa and Mohenjo-daro. University of Pennsylvania. Unpublished Ph.D. dissertation.

Ghosh, A. 1952. The Rajputana Desert — its Archaeological Aspect. *Bulletin of National Institute of Sciences of India*. Vol.1; 37-42.

Gupta, S.P. 1979 *Archaeology of Soviet Central Asia, and the Indian Borderlands*, B.R. Pub. Corp. Delhi. Vol. II.

Gupta, S.P. and Asthana, Shashi 1978. Harappan *vis a vis* Mesopotamian Urbanisation and Town Planning, *Man and Environment*, Vol. II; 47-50.

Gurdip Singh 1971. The Indus Valley Culture. *Archaeology and Physical Anthropology in Oceania*. Vol. VI, 2; 177-89.

Hansman, John. 1973. A Periplous of Magan and Meluhha. *Bulletin of the School of Oriental and African Studies*. London. Vol.36; 554-84.

Hargreaves, H. 1929. Excavation in Baluchistan; 1925. *Memoirs of the Archaeological Survey of India*. No. 35

Jarrige, Jean Francois and Meadow, Richard H. 1980. The Antecedents of Civilization in the Indus Valley. *Scientific American*. August 1980; Vol.243, 2; 122-33.

Joshi, J.P. 1966. Exploration in Northern Kutch. *Journal Oriental Institute Baroda*. Vol.160, 1; 62-9.

———. 1972. Exploration in Kutch and Excavation at Surkotada and New Light on Harappan Migration. *Journal Oriental Institute, Baroda*. Vol.22, 1 and 2; 98-144.

———. 1974. Surkotada: a Chronological Assessment. *Puratattva*. No.7; 34-38.

Jayakar, Pupul 1981. *The Earthen Drum*. National Museum, New Delhi.

Keith, Arthur 1931. The Ancient Mesopotamia of India. *Illustrated London News*. 19 Dec; 1000.

Khan, Abdul Rauf 1981. Kot Kori, a site of Indus Civilization on the Lower Sind. In *Indus Civilization: New Perspectives* A.H. Danied. Islamabad: 43-46.

Khan, F.A. 1958. Before Mohenjodaro; New Light on the Beginnings of Indus Valley Civilization from recent Excavation at Kot Diji. *Illustrated London News*. 24 May.

———. 1965. Excavations at Kot Diji. *Pakistan Archaeology*. Vol.2; 13-85.

Kramer, S.N. 1944. Dilmun: the Land of the Living. *Bulletin of the School of Oriental and African Studies*. No.96; 18-28.

———. 1963. Dilmun: Quest for Paradise. *Antiquity*. Vol.37; 111-15.

———. 1964. The Indus Civilization and Dilmun: The Sumerian Paradise Land. *Expedition*. Vol.6, 3; 44-52.

Krishna Deva and M.C. Cown D.E. 1949. Further Exploration in Sind: 1938. *Ancient India*. No.5; 12-30.

Lal, B.B. 1962. A new Indus Valley provincial capital, *The Illustrated London News*, 24 March, 454-57.

———. 1971. Perhaps the earliest ploughed field so far excavated anywhere in the world, *Puratattva*, No. 4; 1-3.

———. 1975. The Indus Script: Some observations based on Archaeology, *Journal of the Royal Asiatic Society*; 173-77.

———. 1979. Kalibangan and the Indus Civilization, in *Essays in Indian Protohistory*, D.P. Agrawal, and Dilip K. Chakrabarti, ed. Delhi: 65-97.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Lamberg-Karlovsky C.C. 1970. Excavations at Tepe Yahya 1967-69. *American School of Prehistoric Research Bulletin*, 27. Cambridge; Mass.

———. 1971. The Proto Elamite Settlement at Tepe Yahya. *Iran*. Vol.9; 87-96.

———. 1972a. Trade-mechanism in Indus-Mesopotamian Interrelations. *Journal American Oriental Society*. Vol.92, 1; 222-29.

———. 1972 b. Tepe Yahya 1971: Mesopotamia and the Indo-Iranian Borderlands. *Iran*. Vol. 10; 89-180.

Lambrick, H.T. 1964. *Sind: A General Introduction, History of Sind*. Vol.1; Hyderabad.

———. 1967 a. The Indus Flood-plain and the Indus Civilization. *Geographical Journal*. Vol.133; 483-94.

———. 1967 b. The Mohenjo-daro Floods. *Antiquity*. Vol.41.

———. 1971. Stratigraphy at Mohenjo-daro. *Journal Oriental Institute of Baroda*. Vol.20, 4; 363-62.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro*. New Delhi.

———. 1943. *Chanhu-daro Excavations*. American Oriental Series. Boston Museum of Fine Arts.

Majumdar, N.G. 1931. Excavations at Jhukar. *ARASI* 1929-28: 76-82.

Majumdar, N.G. 1934. Exploration in Sind. *Memoirs of the Archaeological Survey of India*. No.48.

Marshall, Sir John. 1924. Fresh Light on Long Forgotten Civilisation. *Illustrated London News*.20 Sept.

———. 1926. *Annual Report of the Archaeological Survey of India*, 1923-24.

———. 1931. *Mohenjo-daro and the Indus Civilization*. 3 Vols. London.

Mughal, Mohammad Rafique. 1970. *The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan*. University of Pennsylvania. Unpublished Ph.D. dissertation.

———. 1973. *The Present State of Research on the Indus Valley Civilization*. International Symposium on Mohenjo-daro.

———. 1981. New Archaeological Evidence from Bahawalpur. *Indus Civilization: New Perspective*. A.H. Dani ed. Islamabad 33-42.

Oppenheim, A.L. 1954. Seafaring Merchants of Ur. *Journal of the American Oriental Society*. Vol.74; 6-17.

Piggott, Stuart. 1943. Dating the Hissar Sequence —the Indian Evidence. *Antiquity*. Vol.17; 169-82.

———. 1946. The Chronology of Prehistoric Northwest India. *Ancient India*. No.1; 8-26.

———. 1947. A New Prehistoric Ceramic from Baluchistan. *Ancient India*. No.3; 131-42.

———. 1948. Notes on Certain Pins and a Mace-head from Harappa. *Ancient India*. No.4; 26-40.

Raikes, R.L. 1963. The End of the Ancient Cities of the Indus Civilization in Sind. *American Anthropologist*. Vol.66; 284-99.

———. 1965. The Mohenjo-daro Floods. *Antiquity*. Vol.39; 196-203.

———. 1967 a. The Mohenjo-daro floods - further Notes. *Antiquity*. Vol.41; 64-66.

———. 1967 b. *Water, Weather and Prehistory*. New York.

———. 1968 a. Kalibangan: Death from Natural Causes. *Antiquity*. Vol.42, 286-91.

———. 1968 b. Archaeological Exploration in Southern Jhalawan and Las Bela (Pakistan). *Origini*. Rome.

Raikes, R.L. and Dyson, Robert. 1961. The Prehistoric Climate of Baluchistan and the Indus Valley. *American Anthropologist*. Vol.63; 265-81.

Ramaswamy, C. 1968. Monsoon over the Indus Valley During the Harappan Period. *Nature*. Vol.217; No.5129; 628-9.

Rao, S.R. 1963 a. Excavations at Rangpur and other Explorations in Gujarat. *Ancient India*. Nos. 18 and 19; 5-205.

———. 1963 b. A Persian Gulf Seal from Lothal. *Antiquity*. Vol.37; 96-99.

———. 1973. *Lothal and the Indus Civilization*. Bombay.

Ross, E.J. 1946. A Chalcolithic Site in Northern Baluchistan. *Journal of Near Eastern Studies*. Vol.5; 4; 291-315.

Sharma, Y.D. 1955/56. Past Patterns of Living, as Unfolded by Excavations at Rupar. *Lalit Kala*. Vols. 1 and 2; 121-29.

Singh, Gurdip. 1971. The Indus Valley Culture. *Archaeology and Physical Anthropology in Oceania*. Vol. 6, no. 2; 177-89.

Starr, R.F.S. 1941. *Indus Valley Painted Pottery: A Comparative Study of the Designs on the Painted Wares of the Harappa Culture*. Prince.

Stein, Sir Aurel. 1929. An Archaeological Tour in Waziristan and Northern Baluchistan. *Memoirs of the Archaeological Survey of India*. No.37.

———. 1930. An Archaeological Tour in Upper Swat and Adjacent Hill Tracts. *Memoirs of the Archaeological Survey of India*. No.42.

———. 1931. An Archaeological Tour in Gedrosia. *Memoirs of the Archaeological Survey of India*. No.43.

———. 1937. *Archaeological Reconnaissence in north-western India and south-eastern Iran*. London.

———. 1942. A Survey of Ancient sites along the Lost Sarasvati. *Geographical Journal*. Vol.99, 4; 179-82.

———. 1943. On Alexander's Route to Gedrosia. *Geographical Journal*. Vol.102, 5-6; 193-227.

Thapar, B.K. 1969. The Pre-Harappan Pottery of Kalibangan: An Appraisal of its Interrelationship. In *Potteries in Ancient India*. B.P. Sinha ed. Patna.

———. 1973 a. Synthesis of the Multiple Data as obtained from Kalibangan. In *Radiocarbon and Indian*

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Archaeology. D.P. Agrawal and A. Ghosh ed. Bombay.

———. 1973 b. New Traits of the Indus Civilization at Kalibangan: An Appraisal. In *South Asian Archaeology*. Norman Hammond ed. London.

———. 1975. Kalibangan: a Harappan Metropolis beyond the Indus Valley. *Expedition*. Vol.17, 2; 19-32.

———. 1977. Climate during the Period of the Indus Civilization: Evidence from Kalibangan. In *Ecology and Archaeology of Western India*. D.P. Agrawal and B.M. Pande ed. 67-74.

———. 1981. The Mosaic of the Indus Civilization Beyond the Indus Valley. In *Indus Civilization: New Perspective*. A.H. Dani ed. Islamabad. 55-64.

———. 1979. The Harappan Civilization: Some Reflection on its Environments and Resources, and their Exploitation. Paper read at *The International Symposium on Harappa Culture*. Srinagar. June 1979.

———. 1979. Indus Civilization: the First Urbanization of the Indo-Pakistan Sub-continent. Paper read at *The International Sympoisum on pre-and proto-historic archaeology: Palast und Hutte*. Berlin.; November 1979.

Thapar, Romila 1975. A Probable Identification of Meluhha, Dilmun and Makan. *Journal of the Economic and Social History of the Orient*. Vol.18, 1; 1-42.

Vats, M.S. 1935. Kotla-Nihang. *Annual Report of the Archaeological Survey of India for 1929*. 131-32.

———. 1936. Chak Purbane Syal *Annual Report of the Archaeological Survey of India for 1930-34*. 106ff.

———. 1937. Excavations at Harappa. *ABIA*. Vol.12; 1-9

———. 1940. *Excavations at Harappa*. 2 Vols. Delhi.

Wheeler, R.E.M. 1947. Harappa 1946. *Ancient India* No. 3; 58-130.

———. 1954. *Archaeology from the Earth*. Oxford.

———. 1966. *Civilization of the Indust Valley and Beyond*. London.

———. 1968. *The Indus Civilization*. Cambridge.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

2

Gregory L. Possehl

Archaeological Terminology and the Harappan Civilization

It is appropriate to note, if only for emphasis, that there is a close relationship between terminology. and theory in archaeology (and other sciences). There are no value neutral systems in this area. I have thus been led to re-think, at a fundamental level, what I mean when I use many of the words that are commonplace in Harappan scholarship. This includes terms like 'civilization', even the very notion of what 'Harappan' means, or does not mean.

The 'Indus' and 'Harappan'

There are two names that have been applied to ancient India's first phase of urbanization or civilization: 'Harappan' and 'Indus' as in 'Harappan Civilization' or 'Indus Civilization'. The first of these is derived from a noble tradition which uses a type specimen, or site, as the basis for nomenclature in archaeology, and for that matter palaeontology. Since the mounds adjacent to the modern village of Harappa were the first locality where the remains of this civilization were identified, the designation 'Harappan' fits such a system perfectly. The second name 'Indus Civilization', and I use them interchangeably since for me they refer to precisely the same cultural, chronological, and geographic entity, has a history of usage that goes back very far into the research on this urban system. The earliest reference which I have found was written by John Marshall (1924-25:60) in the *Annual Report of the Archaeological Survey of India: 1924-25*, where he draws notice to the 'Prehistoric civilization of the Indus.' There may be an earlier reference but clearly the most powerful of these early uses of term comes with Sir John's site-report titled *Mohenjo-daro and the Indus Civilization* (1931). This was followed by E. J. H. Mackay's *Early Indus Civilization* (1935), Sir Mortimer Wheeler's *The Indus Civilization* in three editions (1953, 1960 and 1968) and even my own *Indus Civilization in Saurashtra* (1980).

While both these terms can be justified in some ways, neither of them is without its shortcoming. For example, the very notion of the 'Indus Civilization in Saurashtra' is possibly out of place given the fact that Saurashtra is reasonably beyond the geographic bounds of the Indus Valley, as are Haryana, Indian Punjab and western Uttar Pradesh — other regions within which 'Indus' remains have been found. But when John Marshall coined the term, I suspect that he was reacting against the even more parochial character of the concept of an 'Harappan Civilization' and found that the larger geographic context of the greater Indus riverine system was simply more appropriate.

After all the term 'Harappan Civilization' conjures forth a notion that the civilization began at a site, and that that place best represents the ancient urban system. Of course, neither of these points is true.

The tradition of formulating terminology based on the 'type fossil' concept stems from and leads to a particular theoretical position. For example, it tends to collapse variation, and thus diminish its effect, in an attempt to name things. It leads scholars to emphasize the shared, common features of cultures or taxa, at the expense of differences. This way of doing things also tends to reduce

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

culture to a static typology of features rather than emphasizing dynamics, process and variation; the 'ecology' of things, which most modern workers in all sciences, both social and physical, find so rewarding.

On the other hand, we need a name for this — the most ancient of South Asia's urban systems — and, as long as we are not trapped by our own words, either term can suffice. But, it should be kept in mind that both terms have limitations, especially 'Harappan' if it is used in the type fossil sense.

The Beginnings Of The Harappan Tradition

It is clear to all scholars who are familiar with the prehistoric archaeology of Pakistan and western India that the foundations of the Indus Civilization begin with the initiation of food production on the plains of the greater Indus Valley. The excavations at Mehrgarh (Jarrige 1979; Jarrige and Meadow 1980) are particularly interesting and important in this regard since we now have documentation that this foundation was laid in the sixth or even seventh millennium B.C. There is, thus, a long history of food producing, village farming communities in this region and it must be in this cultural environment that we seek the roots of the Harappan urban system. The record of these neolithic and chalcolithic communities is a complex, varied one that has not yet been fully understood, or even exposed for examination. However, the continuity of this cultural material, all set within a pattern of regional stylistic variation, is such that it can be formed into a tradition of life during the millennia preceding urbanization. That is, the cultural history of western India and Pakistan during this period does not seem to incorporate any major discontinuities or disjunctions. Migration in and out of the region can reasonably be projected to have been a part of this history, if only for the fact that the movement of populations, both large and small, especially in this part of the sub-continent, are relatively constant, pervasive feature of life. But the archaeological record, as we know it, does not indicate a wholesale replacement of population or culture during this early period, prior to urbanization in the greater Indus valley. On the contrary, the continuity and gradual internal development of this cultural tradition is abundantly apparent. The pace of change was clearly varied; however this should not be used to mask the fact that autocthonous change is the dominant theme revealed by excavation.

The Mature Period

The cultural history of the Indus region shows that this long history of agriculture and animal husbandry led, by some yet-to-be-understood process, to urbanization — or civilization. This period has been frequently called the Mature Harappan Period. It is clear, to me anyway, that the long history of gestation that led to the Mature Harappan can be contrasted to a relatively short period of transition between the non-urban and urban stages. This position has been stated fully elsewhere (Possehl, in press) but in short it holds that the jump to full urbanization in the greater Indus Valley took place rapidly, proceeding from a relatively undifferentiated village base. This does not deny that the roots of civilization lie within this region, nor does it suggest that this 'gestation' period was short (Dyson, in press). It simply states that there was a short period of rapid cultural change that immediately preceded Harappan urbanizatioin. To understand this more fully, and to lend further substance to a discussion of terminology, it is necessary to say a few things about ancient civilizations.

SOCIAL ORGANIZATION

CIVILIZATION: There is a plethora of terms that archaeologists use when they address the issue of complex social organization. The four terms most frequently used are: civilization, urbanization, complex societies and states. While there is some basis for treating these terms — and the concepts they represent — as synonymous, there are also subtle differences between them. Each tends to highlight a particular facet of a complex human organization. For example, 'civilization' tends to focus on the cultural aspect of life and deals inclusively with the totality of large, long-lived human traditions. These tend to be historically deep and geographically expansive. This phenomena can be extraordinarily difficult to control if one is seeking the solution to problems not related to historical phenomena on this scale. As A.L. Kroeber (1953:275) has said:

> To the *historian*, civilizations are large, somewhat vague segments of the totality of historical events which it may sometimes be convenient or useful to segregate off from the remainder of history, and which tend to evince certain dubiously definable qualities when so segregated. To the *student*

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of culture, civilizations are segments of the totality of human history when this is viewed less for its events, and less as behavior and acts, than as the more enduring products, forms, and influences of the actions of human societies. To the *student of culture,* civilizations are segregated or delimited from one another by no single criterion: partly by geography, partly by period; partly by speech, religion, government, less by technology; most of all, probably, by those activities of civilization that are especially concerned with values and the manifest qualities of style (italics mine).

In short, civilization can be said to relate to the cultural aspect of life and to historically long-lived cultural traditions. But, the concept does have a long and chequered history which, to some, conjures notions of good and evil, legitimate and illegitimate and a typology of cultures implying vaguely stated notions of progress as postulated by Lewis Henry Morgan (1907). The impact of this aspect of the term may be clearest when we put it into the adjectival form 'civilized'. I think that competent users of English will find the meaning of this form of the word particularly value-loaded and inappropriate for the objective study of man's past and culture process.

Nonetheless, there is a place for 'civilization' in scholarly thought and, despite its faults, I tend to come back to it. One reason for this emerges as a contrast to what Robert McC. Adams (1966: 12) states in the opening pages of his exceptional book, *The Evolution of Urban Society:*

This study . . .tends to stress 'societal' variables rather than 'cultural' (civilization) ones. Perhaps in part, such an approach is merely an outgrowth of limitations of space; social institutions lend themselves more easily to the construction of a brief paradigm than do the tool types or pottery styles with which the archaeologist traditionally works. But I also believe that the available evidence supports the conclusion that the transformation at the core of the Urban Revolution lay in the realm of social organization. And, while the onset of the transformation obviously cannot be understood apart from its cultural and ecological context, it seems to have been primarily changes in social institutions that precipitated changes in technology, subsistence, and other aspects of the wider cultural realm, such as religion, rather than *vice versa.*

But, there are still contexts within which a stress on cultural features of complex social systems is interesting and rewarding. Moreover, there is no sound evidence the causality is as unidirectional as Adams suggests. For example, there are important thoughts, such as Robert Redfield's, on the urban transformation as an evolution of not only appropriate social institutions but other features of human life such as the development of speculative thought and a shift in man's perceptions concerning his place in a larger cosmos (Redfield 1953). While it is clear that this kind of 'humanistic' theme is but one aspect of a larger whole, it is an important one that has been largely ignored by many contemporary archaeologists. This is, in no small part, due to the fact that it is extraordinarily hard to control in a non-literate archaeological context. But there are more serious issues of cause and effect involved, as noted by Adams in the quote I gave above.

URBANIZATION/URBANISM: The sense that urbanism stresses the social aspect of a complex human organization has already been noted in the Adams' quote. Some authors, like Redman (1978: 215-1b) also use the term to highlight a level of organization encompassing the city as a distinct form of settlement:

Although the terms city and urbanism (can be) used somewhat interchangeably . . .it should be borne in mind that there is a distinction between the two Urbanism implies the characteristics that distinguish cities from simpler community forms; it also refers to the organization of an entire urban society, which includes not only cities, but also towns and villages. A city, on the other hand, is the physical centre manifesting many important characteristics of the urban condition.

A primary characteristic in any definition of a city is its population, in terms of both size and density. Cities are generally larger and denser than other types of settlements. It might be possible to set a lower limit to the size of a city, but this would deny the special character of an urban complex. A lower limit of 5,000 people is a useful rule of thumb for differentiating cities from towns, but it must be kept in mind that population aggregates of even larger size do exist without the integration characteristics of a city, whereas communities with fewer people might have all the other requisite urban criteria. Hence large size is diagnostic of cities, but not a sufficient definition.

The most important quality defining a city is its complexity and form of integration. Cities are made up not simply of large populations but of large diverse populations that account for the economic and organizational diversity and interdependence that distinguishes a city from simpler settlement forms. Archaeologists and social historians measure these factors in several ways. The presence of monumental architecture is easily discoverable evidence for organizational mechanisms that control large groups of people. It is also an indication of the probable participation of craftsmen. Manufactured goods suggest craft specialization, and an uneven distribution of such goods implies a wealthy elite. To support the craftsmen and the elite — both of whom probably do not grow their own food — the agricultural base must be efficient so that farmers can produce more than they need, and there must be mechanisms for collecting and redistributing these surpluses.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

I find it possible to think of urbanization as civilization without the burdensome dimension of an historically deep *cultural* life and tradition. They both certainly relate to a level of complexity in human organization that will be described in greater detail at a large point. The differences lie in the greater scope the concept of 'civilization' carries with it.

Complex Society: The notion of a 'complex society' seems to be gaining in the common currency of archaeology. Perhaps this is due to the fact that it focuses on the form of human organization, the size of society and the manner by which institutions are articulated one to another. The complexity that it refers to, is derived from the fact that society is internally differentiated and structurally specialized. That is, the institutions, the social units or segments such as the political system, the economic system, various organs of production and distribution and the like, tend to be distinct units. The personnel in these social configurations tend also to be specialists who do one, or a few, things for their livelihood. Thus, the socio-cultural system can be said to have been differentiated, segmented, separated into parts that are more distinct than simpler forms of social organization such as bands or tribes. These differentiated social and/or cultural segments therefore tend to be specialized in function, as demanded by the place the organization occupies in the larger, urban, civilizational whole.

The comparative complexity of this kind of social system comes from firstly, the increased number of differentiated, specialized roles that build up around a large scale socio-cultural structure; and secondly, from the vastly larger number of 'links' that are necessary between these specialized roles and functions. These connections insure that goods and services flow from places of origin to places of need within the system.

Of course, all of the above is best stated in comparative terms. There are many socio-cultural systems in the world that are smaller in scale than urban examples and where the differentiation and specialization is either not perceptibly present or where this phenemenon is not as developed as it is in the urban form. In these kinds of societies, institutions and people tend to be multifunctional. Specialization of career is unheard of and the division of labour is based on the two great axes of age and sex. Such societies are characterized as simpler because they are small and the number of explicit roles are fewer in number. This obviously results in a much smaller need for explicit linkages between persons and institutions.

I find that the equation — complex societies equal urbanized ones — is basically unobjectional; although I confess that I use the former term only for stylistic reasons. I find its failings lie precisely where urbanism fails — it deals poorly with the deeper aspects of historical tradition and in the area of values and world view that the concept of a civilization handles so well.

State: The final concept here — the State — while quite current, especially among anthropologically oriented archaeologists, really solves no problems not taken care of by one of the preceding alternatives and is, in fact, weak in a fairly obvious way. That is, it simply takes as its starting place a particular institution and emphasizes one part of a holistic configuration as the centre of growth, differentiation and change. It is, in this sense, narrow. It distorts examination of the change process. If not completely confusing relationships of cause and effect in the growth of urban systems, it makes it unnecessarily difficult to place important institutions, except the State, within the total socio–cultural system where their role in the process can be dealt with evenhandedly, on par with the mechanisms of social control.

Each of these terms or concepts, that I have briefly reviewed here has some degree of utility in exploring one of human kind's great achievements in development. Each of them highlights a particular facet of this holistic process and I am sure it will continue to retain some currency in historical thought. But, there are other issues concerning the emergence of urban systems that can profitably be discussed before pursuing the terminological issue that is the focus of this paper. Principal among these other issues is the way in which archaeologists can identify complex societies in the archaeological record and how the process of culture change can be understood.

Other Issues

Childe's Thought: Archaeological thought on this subject, in the modern era at any rate, begins with V. Gordon Childe's (1950) classic paper 'The Urban Revolution'. His so-called ten criteria

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

for urbanization are a classic of typological method for defining a stage of human development. These 'criteria' are briefly:

1. cities;
2. full-time craft and career specialists;
3. taxation;
4. monumental architecture;
5. social stratification;
6. exact and predictive sciences;
7. writing;
8. developed artistic styles;
9. long distance trade in luxury items; and
10. the state.

Childe's scheme has been rather severly criticized elsewhere (Redfield 1953; Adams 1966: 10-11) and this need not be fully repeated here. Suffice it to say that the list is an uneven adumbration of features of complex social forms in the sense that not all the 'criteria' seem equally weighted. The notion of the state as a large, differentiated political structure would seem to lie closer to the centre of the urban notion than does, for example, the character of art. Furthermore, it can reasonably be thought that any coherent definition of the state is going to carry with it some notion of taxation. The latter's place on the list, thus, can be seen as a redundancy. Equally to the point, and this, I feel, is the thrust of Redfield's critique, is that taxonomies of Childe's kind miss the mark in being static structures which attempt the impossible: capturing the social, cultural and historical dynamics of life as we know it. On the other hand, Childe's statement was a beginning, as typologies usually are, at more explicitly laying out some parameters of complex societies.

Adams' Thought: Robert Adams has used Childe's typology as a beginning for some of his work. By demolishing the typology and shifting some of the terminology he has generated what he refers to as the 'core trends' of urbanization (Adams 1966: 16). These are: social stratification, political differentiation (state formation), craft and career specialization, urbanism and militarism. The key ingredients of this mix is that they are much more crisply set forth than previous attempts, Childe's included, and Adams treats them not as a typology but as an interdigitated, interrelated set of variables in a systemic context. He thus focuses on urbanization, or the process of civilization, as a holistic phenomenon. His core trends are useful tools by which to chart culture change, but he deals with them not as individual parts of a typology but as aspects of a sum of parts that in a systemic sense has properties of its own by virtue of the combination of elements.

Further Steps Toward A Definition

Urban systems are then large, complex sociocultural systems. The state is the political form which civilizations take. This is a large formal system of government ruled by a professional bureaucracy incorporating the full concept of kinship in ancient examples. The state carries with it the notion of formal law and the monopoly of force. Crime is defined, judged and punished by the state as an institution, not by a series of individuals. It incorporates an elaboration of roles or positions within its structure. These are defined independently of the person who fills that role or office. These roles are also stratified, ranked in terms of their importance or access to power. In this sense, the state is a formal, and impersonal means of social control, as opposed to other systems where roles are determined by the personal qualities of the members of society and where offices are not present. The same is true for roles in other aspects of the urbanized society. For example, in religion, the various roles are differentiated not only laterally, in terms of the tasks to be done, but vertically, in terms of a hierarchy of control, access and power.

Cities, or large settlements, act as centres of control, seats of authority and are, characteristically, the arena within which the intensity of urban life and processes are acted out. Display of social structure and hierarchy, state aggrandizement and the like are most clearly revealed within this highly charged context.

Kent Flannery (1972:406) has noted of civilizations, or as he chooses to designate them 'states':

> States usually have popoulations numbering at least into the hundreds of thousands (and often millions), only a certain percentage of whom are engaged in actual production of food; many are full-time craft specialists residing in urban occupational wards. They attain a high level of artistic and 'scientific' achievement, often because of the state's support of, and constant demands upon, artisans of all kinds. States have public buildings, works, and services of various sorts, usually implemented through professional architects, engineers and bureaucrats. Among these will usually appear public works of a religious nature, attended by full-time

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

specialists maintaining a state religion. Such a religion typically has a pantheon of gods with an internal hierarchy and task-differentiation as complex as that of human society itself. In addition, many states use an 'official' art style to portray these gods (and the secular rulers who serve them) throughtout the area they control or influence, even when those areas are ethnically and linguistically diverse.

Civilizations are thus usually very large, in terms of both geographical dimensions and the populations that the state controls. It follows then that they are characteristically composed of many kinds of people. They are multi-ethnic. This is not generally true for smaller, less complex forms of human organization; for example, that which preceded the ancient cities of the Indus. But it is important since two things flow from it. First, there is a shift in the way in which 'citizenship' or group membership is defined. In the classic 'little community', kinship—that is the web of relatedness—is what defines an individual as a member or non-member of a particular social or political unit. But since civilizations are made up of many of these kinds of groups, the basis for citizenship tends to shift to notions of territoriality and where one was born, as opposed to kinship, in defining group membership. The many different kinds of people, with their varied histories, values and belief systems leads to a second civilizational phenemenon. Early civilizations tend to foster allegiance to the state, and regulate the inherent divisive forces in large human groups lacking shared histories, by building what Robert Redfield has called 'Great Traditions' (Redfield and Singer 1954). This is a concept that has come to mean less to social scientists than it once did; but it seems to me that it still leads us to an important point. These 'Great Traditions' are the systems of belief synthesized from the histories of their multi-ethnic populations. These are essential to causing the individual civilization to hold together using some dimension of cohesiveness other than brute force. In this sense, 'Great Traditions' are both identifiable and unique to the kind of complex social form I am interested in here.

Harappan Urbanization

How does the archaeological record of the Indus Civilization compare with the features and processes of urbanism that have just been discussed? In fact, there is little direct evidence for many of the deeper institutional configurations of this ancient cultural system. Thus, many inferences have had to be used to reconstruct a convincing picture of the level and character of the Harappan socio-cultural system. For example, the size and architectural complexity of Mohenjo-daro and Harappa obviously mean something in terms of a measurement of socio-cultural development. The lay-out of the streets, the presence of a large-scale drainage system with its requirement for constant tending, the monumental 'citadels', all can be taken as an indication of tendencies toward strong central government. This is the very kind of thing the state or differentiated, specialized organization would be expected to produce. Similarly, the presence of writing was, and still is, taken to indicate a level of organization appropriate to the label 'civilization'.

It is interesting to note that the place of writing in an understanding of civilization has been rather vastly altered over the years. It can be recalled that in the discussion of 'civilization' offered earlier in this paper, it was no where mentioned as a core trend, or a variable of great moment. This is due to a realization that it is in no way an independent variable. In other words, writing orginated in situations where it was called for, by the interaction of variables much closer to the core of things urban.

Other features of urbanization that the early scholars of things Harappan focused on, was the abundant evidence for elaborate craft specialization and the contacts with other reasonably distant parts of Asia. This was betrayed, for example, by the abundant presence of foreign raw materials at both Mohenjo-daro and Harappa.

One of the greatest challenges to Indus archaeology today is creating a clearer sense of the Harappan urban institutions. For example, we know almost nothing about the form of the state. Yet, we can reasonably infer, that there was a political organization of this type. We know very little about the form the economic institution took and yet we know that imports were made from Afghanistan, Baluchistan, eastern Rajasthan and central, even south India. Maritime commerce with Mesopotamia is also a part of their life. But the inner workings of these complex aspects of the Harappan economy completely elude us.

The Final Phase of the Harappan Tradition

One of the things that distinguishes the history of research on the Indus civilization from that associated with other great urban systems of anti-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

quity is that until excavation took place there was never a hint that this great human achievement was buried beneath the plains of the greater Indus Valley. There was no written history in ancient India, or anywhere else that told us that there was a phase of urban life which preceded the early texts of the greater Hindu tradition. In other words, the urban system disappeared from both memory and written sources in the 4000 years between the urban Harappan period and the present. This is clearly a contrast to the Dynastic Egyptian, Mesopotamian and ancient Chinese civilizations. These come to us as historical realities despite similar if not greater time distances. That the Harappan cultural tradition was not carried forward, even to Vedic times, coupled with the fact that Mohenjo-daro, Harappa, Kalibangan and many of the other Harappan settlements, especially the most complex ones, were abandoned during the early centuries of the second millennium B.C. suggests forcefully that something worthy of investigation and explanation took place here.

This process has frequently been seen in traumatic terms in the sense of being a very short, dramatic historical event in the classic sense of that word 'event'. For example, it was once fashionable to accuse Indra and his Aryan followers of the death of this civilization (Wheeler 1948: 78-83). Attention has also been focused on devastating floods (Raikes 1964). But it is now clear that whatever happened to the Indus Civilization in the opening centuries of the second millennium B.C., we are dealing with a long term process which was unevenly paced throughout the Indus region. There are fairly clear indications that there may have been a series of inter-related causes. For example, the capture of the greater Sarasvati system and the evolution of the Yamuna River is almost certainly involved in the disruption of the northern Harappan zone (Raikes 1968; Agrawal and Sood, in press; Mughal, in press). In this case, long term tectonics are held to be responsible for the Yamuna stream capture of the greater Sarasvati system which eventually led to the drying-up of the major water source for what seems to have been a centre, if not *the* centre, of Harappan settlement. This inference comes from the recently completed survey of the western Sarasvati area in Pakistan where M.R. Mughal has found over 100 Mature Harappan settlements in Cholistan along this now dry river. We know that by the end of the second millennium B.C., the settlement pattern in this area had been radically altered and villages were by then established within the entrenchment of the Sarasvati and other streams that are a part of this riverine system. Thus, the drying-up of these streams seems to have begun at the opening of the second millennium and to have been complete by the end of the same era. Shorter term, violent tectonic events are also postulated at Harappan sites (e.g. Kalibangan and Banawali) and they may have played a role in seriously disrupting Harappan life at these place

There is other evidence (Singh 1968) that the early part of the second millenium B.C. was a time of deficient rainfall in western South Asia. While such claims lead archaeologists into extremely complex areas of research, the possibility that this is part of the greater Indian historical record is a real one and further investigation of the case is in order. It could, after all, have had a significant impact on the Harappan subsistence regime, especially in the areas far removed from the great rivers. For example, a prolonged period of drought, failed monsoons, would have had a disastrous effect on grasslands, especially in marginal environments, such as western Rajasthan and Kutch, and could have had a serious impact on the large pastoral nomadic Harappan population as has been hypothesized (Possehl 1979).

Other scholars have recently suggested that disease, or physical disabilities, may have weakened the labour force of the Indus Civilization (Kennedy, in press; Vishnu-Mittre, in press). These are interesting and significant observations that both add substance to the argument presented here and deserve further investigation to clarify the proposition.

The chronology for events such as those mentioned above is still being perfected. There are some suggestions, however, that the dissolution of the Mature Phase of the Indus Tradition took place at a later time in the north-east and south-west if these regions are compared to Sind and Punjab. Moreover, there may be a chronological priority for the entire process in the southern zone of the Harappan toparchy.

Thus while it is all still very imperfectly understood in detail, this much is clear: the historical processes impinging on Harappan life in the early second millennium were complex, varied and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

paced at different times in different regions. What is equally clear is that, in their interrelated totality, they had a stunning effect on these peoples. What had once been an ancient urban system was much altered in terms of the complexity of organization. The major urban centres were no longer functioning as cities. If there was settlement within their bounds it is best characterized as squatters abodes. Signs of writing, long distance trade in luxury items, monumental architecture, most craft specialization, all disappear. The unified system of weights and measures of the Mature Period of Harappan urbanization disappears along with the inscribed stamp seals, seemingly the property of an elite population. The large differentiated settlements, many as at Lothal, or Mohenjo-daro, broken down into 'quarters' where public architecture, workshops and domestic quarters were clearly demarcated are no longer found.

The Indus region also seems to break up into a series of stylistic zones during this period. That is, during the Mature Harappan there is a sense that we are dealing with a single entity when we speak of the Indus Civilization. By the middle of the second millennium, this is no longer the case. The archaeological record of Indian Punjab, Haryana and eastern Uttar Pradesh forms a rather distinctive stylistic zone which is quite separate and identifiable vis-a-vis the so-called Cemetery H material from Harappa and the Cholistan/Bahawalpur area. Sind is, in turn, culturally identifiable as a stylistic unit and so is the abundant material of this period in Gujarat. An interesting, and yet to be understood pattern in this, is that the boundaries which emerge in this period are quite similar to those which were apparent in the period just preceding the full flourishing urban life.

There is clearly much more to be learned of the early second millennium B.C. culture history in western India and Pakistan, but a few things appear to be evident. The two, or possibly three major urban centres which were fully inhabited during the Mature, Urban Phase of Harappa life were abandoned so that, for all intents and purposes, we can no longer think of their inhabitants as living a city life. The writing system is no longer evidenced except as cursory graffiti scratched generally as single signs on pots.

I have elsewhere (Possehl 1975) referred to this phase of the Harappan Cultural Tradition as 'Post-urban'. I used the term to create a contrast to the earlier phases of Harappan life and to create a terminology which reflected what we know, or seem to know about Harappan life.

THE PHASE TERMINOLOGY

Pre-urban, Urban and Post-urban

The terminology developed (Possehl 1977) for phases of what I perceive to be the Harappan Cultural Tradition is based not on time or chronology but on some sense of the level of socio-cultural development apparent within various stages of the Harappan tradition. Of course there is some kind of general chronological meaning to the terms Pre-urban, Urban and Post-urban but as our knowledge of Harappan culture history has been refined, these chronological implications have tended to become less and less important. That is, as we learn more about the varied pace of culture change in different regions of the Indus Civilization, the overall phase chronology tends to break down into meaningless generalities. But, my phase approach to Harappan terminology tends to withstand the ever-present instability of archaeological chronologies. Moreover, questions pertaining to just what a term like 'Pre-Harappan' means, if it is a chronological indicator, are avoided. As it turns out, 'Pre-Harappan', even assuming that it is closely enough defined to place it within the cultural tradition, already means different things in different regions. The term is thus usually a confusing element in discussion since what is really called for is a direct address of chronology. The use of 'Pre-Harappan' can therefore be seen as possibly masking an important issue.

The disadvantages to the phase terminology seem to lie close to the issue I mentioned at the beginning of the paper: the system is theory laden. It presumes that we are very secure in our knowledge of Harappan culture-history for example. The very notion of a 'Post-urban Phase' is in fact a conclusion of no small magnitude. This aspect of my terminology has been criticized by J. Shaffer (1981: 97) when he notes the presence of large, even 'urban', sites in the Post-urban Phase of the east Punjab and Bahawalpur. While I appreciate the fact that there are many questions to be answered of the protohistoric archaeology of these regions, and that there are more than enough interesting sites to be excava-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ted in seeking answers to these questions, I think Shaffer is slightly askew on this point. First of all, large sites are not 'urban' (with or without the quotation marks in the original) simply by virtue of their size. Urbanization, as I have carefully pointed out in this paper, is a form of human organization variously associated with large sites. In other words, Shaffer confuses the true notion of this concept with something quite secondary, and the presence or absence of large sites is not quite to the point. I also add that a marked degree of social complexity may be found in small sites and, although it might *seem* at odds with current theory, it would make as much sense for Shaffer to have made his point by noting the presence of many sites in his region of discussion that are of no apparent magnitude in size. Moreover, there are some positive reasons for it to believe that 'Post-urban' is an appropriate conclusion.

Discussing the Urban Phase of the Harappan Cultural Tradition in this paper, I have laboured over indicating how little direct evidence we have for the core trends of urbanism. Instead we have had to use things like the grid lay-out of Harappan settlements, the writing system, the unified system of weights and measures, indications of trade in luxury items with distant lands, evidence for craft specialization as proxies for social stratification, the state, and other aspects of social differentiation. This is of course, an unfortunate situation, but one that Harappan archaeology cannot avoid. However, if we apply the same indicators used to assess the kind of development apparent in the Urban Phase, to later remains in the cultural tradition, we find substantial differences. There is, for example, no longer a system of writing, nor the system of weights and measures; absent too, is evidence of craft specialists, metallurgists excepted. I will not go through this in any greater detail; but, if compared in this way, the Mature Harappan is substantially different from the Jhukar material, that from Cemetery H, Rangpur IIB and C, the Ochre Coloured Pottery, and the later part of the Siswal sequence. It is this fact that justifies the use of the nomenclature 'Post-urban Phase'.

There may be other terms that are appropriate for Harappan archaeologists to use. It should even be considered that the problem addressed at a particular level should determine the choice of terms. But I think it equally true the isolation of the Pre-urban, Urban and Post-urban phase for the greater Indus Valley is at least congruent with what we know of Harappan culture-history.

REFERENCES

Adams, R.M. 1966. *The Evolution of Urban Society*. London.

Agrawal, D.P. and Sood, R.K. Ecological Factors and the Harappan Civilization. In *Harappan Civilization: A contemporary perspective*. Gregory L. Possehl. ed. American Insitute of Indian Studies and Oxford & IBH Publishers Delhi. (in press).

Childe, V. Gordon. 1950. The Urban Revolution. *Town Planning Review*. Vol. 21, 1; 3-17.

Dyson, Robert H. Paradigm Changes in the Study of the Indus Civilization. In *Harappan Civilization: A contemporary perspective*. Gregory L. Possehl. ed. American Institute of Indian Studies and Oxford & IBH Publishers. Delhi. (in press).

Flannery, Kent V. 1972. The Cultural Evolution of Civilizations. *Annual Review of Ecology and Systematics*. Vol. 3; 399-426.

Jarrige, Jean-Francois. 1979. Excavations at Mehrgarh, Baluchistan: Their significance in the prehistorical context of the Indo-Pakistan borderlands. In *South Asian Archaeology 1977*. M. Taddei. ed. Instituto Universitario Orientale Seminario de Studi Asiatici. Naples; 1: 463-525.

Jarriage, Jean-Francois and Meadow, Richard 1980. The Antecedents of Civilization in the Indus Valley. *Scientific American*. Vol. 243, No. 2; 122-33.

Kennedy, Kenneth A.R. Skulls, Aryans and Flowing Drains: The interface of archaeology and skeletal biology in the study of the Harappan Civilization. In *Harappan Civilization: A contemporary perspective*. Gregory L. Possehl ed. American Institute of Indian Studies and Oxford & IBH Publishers Delhi. (in press).

Krocber, A. 1953. *An Anthropologist Looks at History*. University of California Press. Berkeley.

Mackay, E.J.H. 1935. *Early Indus Civilization*. Clay and Sons, Ltd. London.

Marshall, Sir John 1924-25. The Prehistoric Civilization of the Indus. *Annual Report of the Archaeological Survey of India, 1924-25*; 60-3.

———. 1931. *Mohenjo-Daro and the Indus Civilization*. 3 vols. Arthur Probsthain. London.

Morgan, Lewis Henry 1907. *Ancient Society: Or researches in the lines of human progress from savagery through barbarism to civilization*. Charles H. Kerr & Company. Chicago.

Mughal, M. Rafique. Recent Archaeological Work in Cholistan. In *Harappan Civilization: A contemporary perspective*. Gregory L. Possehl ed. American Institute of Indian Studies and Oxford & IBH Publishers. Delhi.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Possehl, Gregory L. 1977. The End of a State and the Continuity of a Tradition. In *Real and Region in Traditional India.* Richard Fox ed. Vikas. Delhi.

———. 1979. Pastoral Nomadism in the Indus Civilization: An hypothesis. In *South Asian Archaeology 1977.* M. Taddei ed. Instituto Universitario Orientale Seminario de Studi Asiatici, Naples; Vol. 1; 533-51.

———. 1980. *The Indus Civilization in Saurashtra.* B.R. Publishing Corporation. Delhi.

———. *Kulli: Trade and the genesis of the Harappan Civilization.* Carolina Academic Press Durham. (in press).

Raikes, Robert 1964. The End of the Ancient Cities of the Indus. *American Anthropologist.* Vol. 66; 284-99.

———. 1968. Kalibangan: Death from natural causes. *Antiquity.* Vol. 42; 286-91.

Redfield, Robert 1953. *The Primitive World and its Transformation.* Cornell University Press. Ithaca.

Redfield, Robert and Milton, Singer. 1954. The Cultural Role of Cities. *Economic Development and Culture Change.* Vol. 3; 53-73.

Redman, Charles L. 1978. *The Rise of Civilization.* Freeman. New York.

Shaffer, Jim G. 1981. The Prehistoric Period in the Eastern Punjab: A preliminary assessment. In *Indus Civilization: New perspectives.* A.H. Dani ed. Department of Archaeology, Karachi; 65-102.

Singh, Gurdip 1971. The Indus Valley Culture . . . *Archaeology and Physical Anthropology in Oceania.* Vol. 6, 2; 177-89.

Mittre, Vishnu The Harappan Civilization and a Need for a New Approach. In *Harappan Civilization: A contemporary perspective.* Gregory L. Possehl ed. American Institute of Indian Studies and Oxford & IBH Publishers Delhi (in press).

Wheeler, Sir Mortimer 1947. Harappa 1946: The defences and Cemetery R-37. *Ancient India.* No. 3; 58-103.

———. 1953. *The Indus Civilization.* 1st ed. Supplement to the Cambridge Ancient History. The University Press. Cambridge.

———. 1960. *The Indus Civilization.* 2nd ed. Supplement to the Cambridge Ancient History. The University Press. Cambridge.

———. 1968. *The Indus Civilization.* 3rd ed. Supplement to the Cambridge Ancient History. The University Press. Cambridge.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

3

Masatoshi A. Konishi

'Pre'- or 'Early' Harappan Culture: A Conceptual Battle

In 1980 M.R. Mughal published an article entitled 'New Research on the Origin of the Indus Civilization'. On reviewing the sixty year old history of Harappan studies, Mughal criticizes the earlier excavators who tended to see the origins in the West. It is true that cultural diffusion or impetus has been assumed from 'advanced' Mesopotamia or Iran right up the discovery of the civilization and even Rakhal Das Banerji (1923), who excavated Mohenjo-daro for the first time, thought that this new civilization might be related to the Minoan Civilization. In England too, on receiving the news of this remarkable discovery of an hitherto unknown civilization, Sayce (1924) immediately pointed out its similarity with the Susa culture in south-western Iran. Gadd and Smith (1924) also suggested the strong relationship between the new discovery and the Mesopotamian civilization, especially the Sumero-Babylonian phases. It is interesting, therefore, to note that Marshall (1924) the first reporter of the news to England, was quite careful concerning the matter. Though he also points out the resemblance between the Indus script and the Mycenean pictographs, he still recognizes the originality of the new civilization and states that this cannot have been merely derived by the intrusion of West Asian culture or its people. It was D.H. Gordon (1958) who supposed that this Western diffusion was actually brought by a group of people who migrated from the Middle East. These people, he felt, urbanized in the early dynasties of the Sumer and Elam, arrived at the Indus plain through the sea route and challenged the environment, though they had met with a

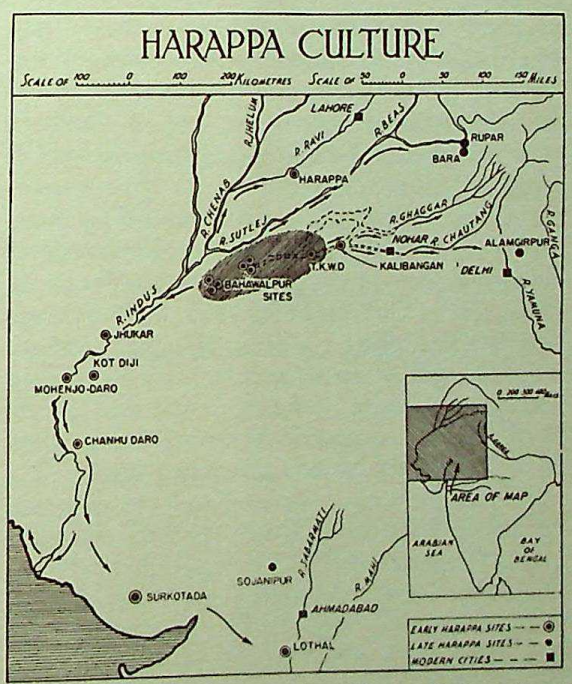


Fig.3.1. Origin and expansion of Harappa Culture after Gupta

'sea-change' on their way to the plain. However, G. Daniel (1968) thought that those who played the role for diffusion were the north-western Indian villagers returning from the Sumeria. But both theories are too conjectural and lack archaeological support.

The Polemics

Mortimer Wheeler, the big influence on Harappan studies, does not see a massimmigrationof people. With his famous saying 'the idea flies', he asserts that the urban idea which appeared in the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

West in the early third millennium B.C. could well 'fly' to the Indian subcontinent 500 years later. (Wheeler 1961). Because the theory of 'idea diffusion' was abstract enough, and because one can still recognize the originality of the Indus Civilization, even though the urban idea may have flowed from Mesopotamia, Wheeler's theory attracted many scholars. True, the extreme views like regarding the Indus Civilization an attribute or a colony-like thing of West Asian civilization have subsided now, but many scholars still consider that the 'urban idea with wings' from the West was what gave the Indus people their direction for development at the first stage.

Contrary to these, the native origin of the Indus Civilization has been put forward, particularly by some Indian and Pakistani scholars. They emphasize the ecological environment of the 'Greater Indus Valley' and the readiness of the talented native people of the time. A. Ghosh's (1965) idea expressed at the symposium held in 1964 at Deccan College, Pune, is a typical example. Ghosh (1952) had already clarified the existence of the Sothi culture in northernmost tip of Rajasthan, but rightly placed it before the urban phase of the Civilization in 1964. He then characteristically called it a proto-Harappan culture, considering it an actual prototype for the Mature Harappan Culture. For him, it was this cultural body which accepted the urban idea, even though it could have flowed from the West.

S.P. Gupta's more recent theory (1976) is also on similar lines. He feels that the Sothi culture, a proto-Harappan culture, re-organized in the old Sarasvati valley, influenced the contemporary cultures of other regions, and thus created the Harappan Culture. In his views the original home of the Indus Civilization was the Saraswati-Ghaggar basin and not the Indus. On the other hand, D.P. Agrawal (1973) saw the pre-urban cultures on the Indus plain gradually becoming Harappan culture and the material basis of the Civilization, and that those pre-urban cultures survived in the rural cultures. The latter theory is interesting on two points. While calling these pre-urban cultures 'pre-Harappan', he does not necessarily see a gap between them and the Harappan culture. On this point, his theory is similar to Mughal's. At the same time, recent archaeological evidence shows the 'pre-Harappan' cultures surviving the Harappan period. This shows up in the peripheral regions like eastern Punjab and Haryana at sites like Siswal and Mitathal (Suraj Bhan 1978).

These cultures, typically, Sothi and Kot Dijian, are essentially pre-urban in character. Can they still be called 'pre-Harappan' cultures, or 'Early Harappan' cultures, or 'phase', as Mughal puts the question? The matter seems a bit complicated.

Mughal's theory (1970, 1973, 1974) may be summarized here as follows: the cultures so far observed at most of the Harappan sites, lying immediately below the Harappan layers, are not pre-Harappan cultures; these are various aspects of a single, Early Harappan, culture, or the early phase of the Harappan culture—be it from the lower strata of Kot Diji, Sothi, Harappa citadel, or Gumla, Sarai Khola, Jalilpur, etc. Therefore, all these assemblages (not separate cultures according to him) seem to form his 'early formative/early urban/early developmental phase'. He may see the striking uniformity among these assemblages all right, but can the individual cultural aspects observed in each of these simply be local variations? Can they really be lumped together to form a single cultural phase in the 'Harappan Culture' (which is, in this case, close to the Indus Civilization in concept)? And even if one admits to their forming an early phase of the Harappan Culture, is it then not contradictory to calling them the 'Early Harappan Culture' as separate from the Harappan Culture. A bit carelessly though, Mughal, in his article in 1980, uses the term 'Early Harappan Period' as well. This should be, more precisely in this context, 'the period of the early Harappan phase', or more properly, 'the period contemporary to the formative stage of the Indus Civilization'.

Many archaeologists now gradually admit that these pre-urban cultures (or assemblages) should be regarded the important formative body of the Civilization. There can, however, be no question that these cultures are 'proto-Harappan' in character, and that they form, together, the formative stage of the Indus Civilization. As will be stated later, even if any sort of the alien cultural traits (or the urban idea) were diffused or introduced at that formative stage, the role played by these cultures as the substantive body which accepted, digested and developed them as their own elements can never be denied.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

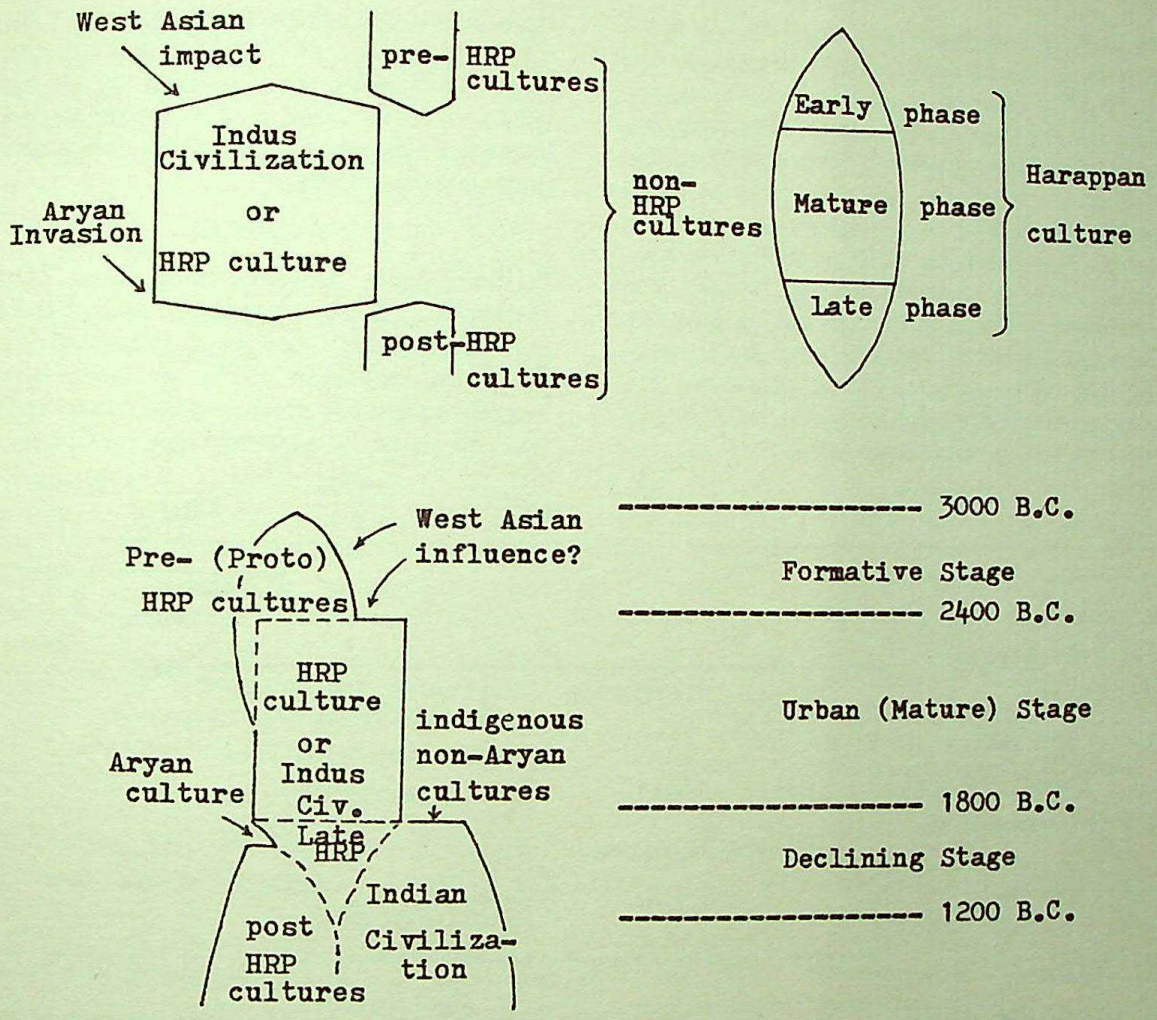


Fig.3.2. Stage of formation of Harappa Culture

One should note here the following points. Even if these cultures are to be accepted as assemblages, a 'culture' in the archaeological context, generally denotes the local assemblages of a certain set of artefacts. Therefore, these assemblages — which could well be considered proto-Harappan or the Harappan prototype in their character, together creating the formative stage of the Civilization — should rather be considered, archaeologically, *cultures*, thereby never neglecting their particular set of artefacts and their local differences.

It is true that in the remarkable uniformity among the artefacts of these cultures, they could well have had close contact with each other. It would be unnecessary, therefore, to regard each, the pre-defence Harappa, Jalilpur II, Gumla II-III, Sarai Khola II, etc. as individual 'cultures' as such — they rather represent the cultural phases of the sequence represented at each site. However, for the purpose of discussion on 'culture', it would be better, at least at the present state of our knowledge, to differentiate the north-eastern assemblages characterized by the cultural traits typical to Sothi culture, from the south-western assemblages characterized by the cultural traits typical to Kot Dijian. Thus we may be able to study more carefully and precisely the interrelationships, or the difference of time and space among them. We must admit that the terminology like 'Kot Diji Culture' or 'Sothi Culture' is essentially based on the pottery typology, but we may still reserve such minute terminologies to set the various assemblages clarified in such sites like Gumla II-III, Jalilpur II, etc., in the right archaeological position, both chronologically and locally.

In the meantime, Allchin and Allchin (1968) call the various pre-urban cultures as 'pre-Harappan'.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and further divide them into three groups according to their ceramic associations: southern (Amri), central (Kot Diji and the pre-defence Harappa) and northern (Sothi). However, among them, the southern or Amri culture belongs to a slightly different context from the other two, as it is really pre-Harappan, both in stratigraphy and in characteristics, and may be better treated in the context of the early south Baluchistan cultures. It is rather their northern and central groups that have the 'proto-Harappan' characteristics, and it is notable that Allchins also call them, elsewhere, the 'pre-Harappan' *culture* in the Indus Valley (italics mine), namely in the singular form.

both clearly differentiated from the urban 'Indus Civilization'. One can question the use of the terms 'civilization' and 'cultures' in the same sphere of terminology, as also the use of 'Indus' instead of 'Harappan', though his difficulties are quite understandable.

A Critique

In this respect, Mughal's three terms 'Mature Harappan', 'Early Harappan' and 'Pre-Early Harappan', which had been presented in his Ph.D. dissertation in 1970, are much clearer, though the first two cannot just be considered the two phases of the singular Harappa Culture, as

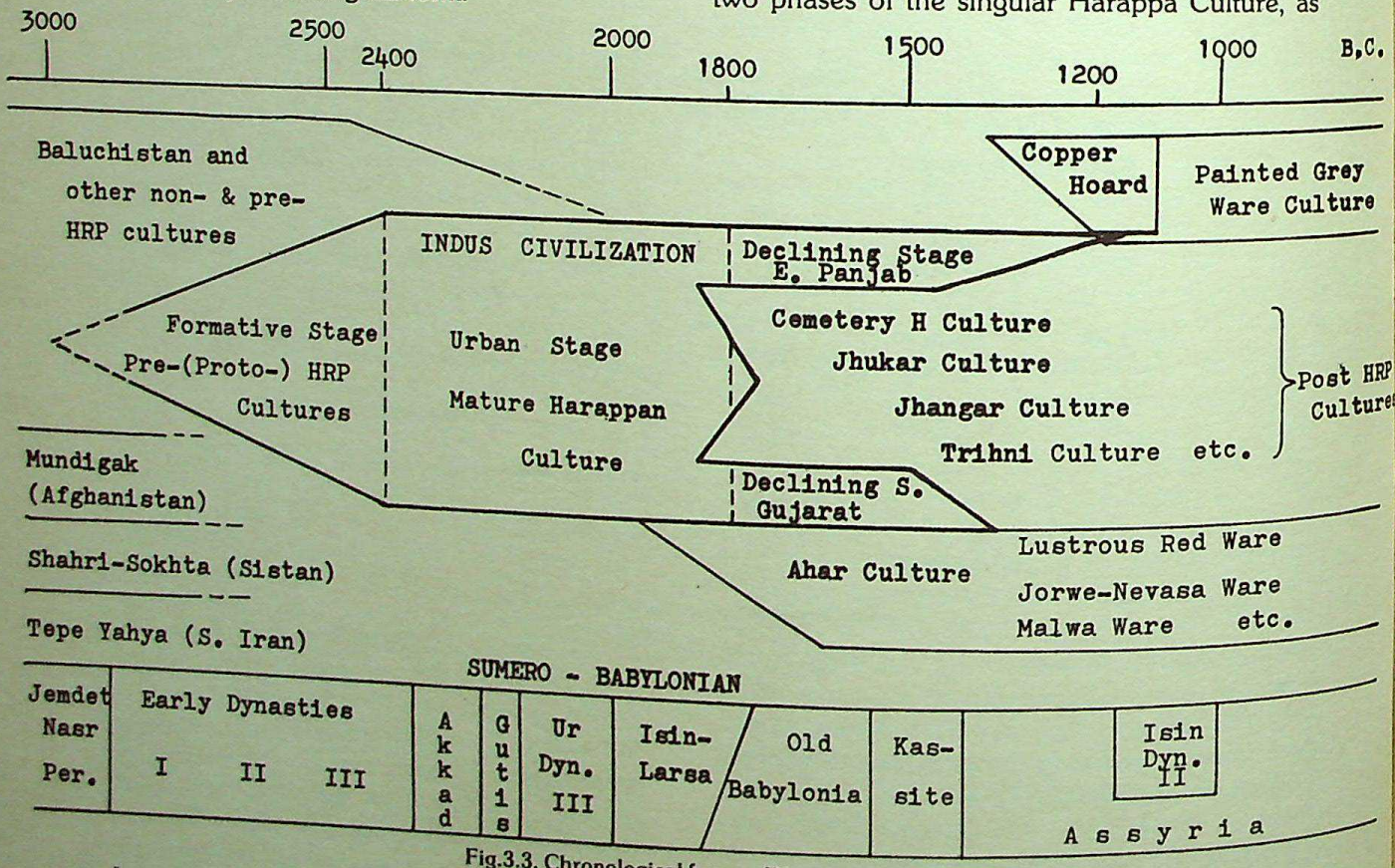


Fig.3.3. Chronological frame of Harappa Culture

In any case, we can readily admit two different types of 'pre-Harappan' cultures. Taking this into account, Dales (1972) emphasized the terminologies of the 'Indus Civilization', 'Early Indus Cultures' and 'Pre-Indus Cultures' at the South Asian Archaeological Symposium held in 1971. His 'Early Indus Cultures' are proto-Harappan in character, and thus not different from Mughal's 'Early Harappan Culture' (though in singular form in this case), while his 'Pre-Indus Cultures' denote the pre-and non-Harappan cultures like Amri, has been stated above. To me, Mughal's 'Mature Harappan' can be simply 'Harappan', and his 'Early Harappan Culture' should be 'Pre-(or proto-, if one prefers) Harappan cultures' (plural form). Amri, Nal, Kalat, Quetta, etc. should not be included in these 'Pre-Harappan Cultures', but may be called by their individual names, otherwise this would be quite misleading. I reserve the age-old terminology or 'Pre-Harappan cultures' for Kot Diji and Sothi cultures only because they are found below the (Mature) Harappan layers, and I

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

do not deny that those may be essentially 'proto-Harappan' in nature. If the archaeological evidence accumulates, we may even call them together 'a culture'.

However, the Indus Civilization, or the Harappa Culture could not have necessarily sprung up only as the result of the organic development of these pre-(proto-) Harappan Cultures. Though many common cultural elements are observed in the Harappa Culture, it is easy to find more important new urban traits, like the well-planned city, a fully developed script, refined seals, many uses of bronze, silver etc. after 2500 B.C. or 2400 B.C. Though there need not have been any kind of mass immigration, nor a big change of the population either, there could still have been a sort of cultural impact at this particular stage of the development. As has been repeatedly emphasized, the local cultures in the Greater Indus Valley or the Plain had been already equipped with the energy to accept and introduce it, and to develop it as their own. But one might still hold the possibility of an outside impetus, however marginal, for the achievements of fully integrated urbanization.

In this respect, Fairservis (1971), for instance, considers three factors for the orgin of Civilization: the outside influence factor; subcontinental (ecological) setting to guarantee the high agricultural productivity; and the social readiness for full urbanization. The second and the third factors are more suggestive than the first, but I will not go into those details here. What he means by the 'outside influence' here is the eastward cultural wave starting from Early Dynastic Mesopotamia. He considers this wave to have diffused to the Afghan-Baluch highlands through the Iranian plateau, further reaching upto the Indus plain, but we need more discussion on this particular point. It is true that the Iranian cultural developments had much to do with the formation and the development of the pre-(proto-) Harappan cultures through the changes met in the Afghan-Baluch highlands. This is well related to the widespread trade of lapis lazuli and chlorite then as evidenced from the sites of Afghanistan, Iran and Turkmenia. This may be further studied, macroscopically, in relation to the trading sphere centring around the 'proto-Elamite' culture, spreading from Susa to Shahr-i Sokhta, and from Hissar to Tepe Yahya.

But there was a notable change in trade routes in the Iranian plateau, in or around the middle of the third millennium B.C. when the Indus Civilization was to flower. The new civilization was to depend possibly more on sea-routes which were connected to further western lands through the Makran coast or otherwise, rather than on the land routes through central Baluchistan. Perhaps southern cultures, like Kulli, might have played a more important role since then, rather than more northern cultures like Quetta and Zhob-Loralai. But, how 'international relationship' changed in the mid-second millennium B.C. and affected urbanization on the Indus plain, or the rise of the Indus Civilization, needs further study. It is only mentioned here so that this problem is tackled seriously along with the problem of the early stage of socio-cultural realization of the Indus Civilization on the plain itself. (Karshima *et al* 1980).

REFERENCES

Agrawal, D.P. 1973. Genesis of Harappan Culture. *Puratattva* No.6; 37-41.

Allchin, Bridget and Raymond. 1968. *The Birth of Indian Civilization.* Hammondsworth; 112-25.

Banerji, R.D. 1923. Explorations and Research, Mohenjo-daro. *Annual Report.* Arch. Surv. Ind. (1922-23); 102-104.

Dales, G.F. 1973. Archaeological and Radiocarbon Chronologies. In *South Asian Archaeology 1971.* N. Hammond ed. 162 ff.

Daniel, Glyn. 1960. *The First Civilizations: The Archaeology of Their Origins.* London.

Fairservis, W.A. 1971. *The Roots of Ancient India.* Chicago; 217-39.

Gadd, C.J. and Sidney Smith. 1924. The New Links Between Indian and Babylonian Civilizations. *Illustrated London News.* 3 Oct. 614-6.

Ghosh, A. 1952. The Rajputana Desert—its Archaeological Aspect. *Bull. Nat. Inst. Sci. Ind.*; 37-42.

———. 1965. The Indus Civilization: its Origins, Authors, Extent and Chronology. In *Indian Prehistory 1964.* V.N. Misra & M.S. Mate ed. Deccan College, Poona; 113-36.

Gordon, D.H. 1958. *The Prehistoric Background of Indian Culture.* Bombay.

Gupta, S.P. 1976. Origin of the Form of Harappan Culture: A New Proposition. *Puratattva.* No.8; 141-46.

Karashima, S; Kuwayama; Konishi, M.A. and Yamazaki, G. 1980. *Indus Civilization — Fountainhead of the Indian Cultures.* Tokyo; NHK Books. 44-45 (in Japanese).

Konishi, M.A. 1977. Excavation of Surkotada, an important Indus City. *Kokogaku Journal.* 131; 5-8 (in Japanese).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Lamberg-Karlovsky, C.C., and Tosi, Maurizio. 1973. Shahr-i Sokhta and Tepe Yahya: Tracks on the Earliest History of the Iranian Plateau. *East & West.* Vol. 23, 1-2; 21-53.

Marshall, John 1924. First Light on a Long-Forgotten Civilization, *Illustrated London News.* 20 Sept. 528-32; 548.

Mughal, M.R. 1980. New Research on the Origins of the Indus Civilization. *Sindhological Studies 3-1.* Jamshoro: Univ. of Sind.

———. 1970. The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan. Philadelphia: Univ. of Pennsylvania. Ph.D. Dissertation (Unpublished).

———. 1973. *The Present State of Research on the Indus Valley Civilization.* Karachi: Govt. of Pakistan.

———. 1974. New Evidence of the Early Harappan Culture from Jalilpur, Pakistan. *Archaeology.* Vol. 27, 2; 106-113.

Pierre, Amiet. 1979. Archaeological Discontinuity and Ethnic Duality in Elam. *Antiquity.* No. 53; 195-204.

Sayce, A.H. 1924. Remarkable Discoveries in India. *Illustrated London News.* 27 Sept. 566.

Suraj Bhan, 1978. *Excavations at Mitathal (1968) and Other Explorations in the Sutlej-Yamuna Divide.* Kurukshetra Univ.

Suraj Bhan and Shaffer, Jim. 1978. New Discoveries in North Haryana. *Man & Environment.* Vol. 2; 59-68.

Wheeler, R.E. Mortimer 1961. Ancient India. In *The Dawn of Civilization.* Stuart Piggott, ed. London; 248.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

4

Dilip K. Chakrabarti

Origin of the Indus Civilization: Theories and Problem

The first hypothesis regarding the origin of the Indus Civilization came from John Marshall. Marshall did not elaborate his ideas; he was concerned more with discovering details of the civilization than with speculating on its origin. Besides, he did not have much data to speculate on. But what he wrote as early as 1924, while reporting on the discovery of this civilization in the *Illustrated London News* of September 20 of that year, is significant and worth quoting in detail.

> . . .it is possible, though unlikely, that this civilization of the Indus valley was an intrusive civilization emanating from further west. What seems *prima facie* more probable is that this forgotten civilization, of which the excavations of Harappa and Mohenjo-daro have now given us a first total glimpse, was developed in the Indus valley itself . . . it is probably true that successive migrations from outside had a useful effect, as they did in Mesopotamia and in Egypt, in promoting the development of indigenous culture, but there is no reason to assume that the culture of this region was imported from other lands, or that its character was primarily modified by outside influences. (Marshall 1924: 548).

Seven years later, in his final report on Mohenjo-daro he was more positive: 'the culture represented must have had a long antecedent history on the soil of India, taking us back to an age that at present can only be dimly surmised' (Marshall 1931: 106). In 1938, Mackay believed that the 'Indus Valley Civilization had some connection with the Uruk Culture of Sumer'. Citing Woolley's opinion that the Uruk people in Mesopotamia were 'invaders from the north' he pointed out that a section of them could have entered India 'bringing with them a culture that developed in a different *milieu*, and perhaps combined with an indigenous culture, produced the civilization that culminated in the great cities of Mohenjo-daro and Harappa' (Mackay 1938: 668). In 1950 Piggott more or less echoed Marshall: 'an origin outside India is inherently improbable, but where and in what form this origin was is quite unknown' (Piggott 1950: 140).

In *The Indus Civilization* first published in 1953, Wheeler (1953: 93-94) formulated his hypothesis in detail and he has not basically changed it in the successive editions of the work. To begin with, he refers to the stimuli behind the growth of civilization in Mesopotamia: the settlement of an upland neolithic people in the river plains, their adjustment to the new environment and new dimensions in social organization matured in the process. The Indus Civilization, he suggests, was the result of similar stimuli at a somewhat later date in the context of the Indus plains. The date being later, the early nonurbanized people of the Indus plains could look upon the Mesopotamian growth as a model, something which would guide them to an easy maturity. When Wheeler writes that 'the idea of civilization came to the Indus from the Euphrates and the Tigris' he means precisely this emulation of the Mesopotamian model. He is well aware that the Harappan culture is 'too individual to be regarded merely as a Mesopotamian colony'.

Wheeler suggests a few other points also. The excavations at Mohenjo-daro in 1950 showed that the huge mud-brick platform in the *Stupa* Area and its associated buildings dated only from the 'Intermediate' period. This implies that the city as such existed before the citadel was built. He also notes that, the slots for horizontal timber

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

work in the burnt-brick construction of one of the early defence towers, and the granary at Mohenjo-daro, are rather unusual in a burnt-brick construction and may suggest the builders' familiarity with mud-brick and timber construction. On the whole, he argues:

> There is the suspicion that the citadel-builders of Mohenjo-daro and of Harappa were innovators, arriving with architectural traditions founded elsewhere upon the manipulation of mud-brick and timber, and imposing themselves upon a pre-existing urban population. The high-built citadels seem indeed to be frowning upon their cities with a hint of alien domination. If so, at Mohenjo-daro that domination must have been dynastic rather than cultural, for the excavations of 1950 hinted at a substantial continuity of culture from the pre-citadel into the early citadel phase. These and other possibilities must be given provisional weight without any undue emphasis. (Wheeler 1953: 93-94).

Wheeler's first assumption that the Indus Civilization had its genesis in the plainward movement of an upland food-producing people does not in reality convey much as a theoretical postulate. It is too general to be specifically useful. His next and basic assumption that the idea of civilization came to the Indus valley from Mesopotamia, is clearly an echo of Kroeber's concept of 'stimulus diffusion' (Kroeber 1940: 1-20). What he does not emphasize is that no idea can germinate in an alien setting unless the setting itself is socio-culturally mature enough to assimilate it within its own framework. The instances Kroeber cites of 'stimulus diffusion' are all mere inventions of isolated cultural traits such as the beginning of the European manufacture of porcelain based on the Chinese idea. He also calls them 'stimulus invention'. Moreover, this hypothesis does not explain the Indian 'style' or 'form' of the Indus Civilization (Coulborn 1959: 26). Wheeler's third assumption that 'the high-built citadels seem ... to be frowning upon their cities with a hint of alien domination' and that 'at Mohenjo-daro that domination must have been dynastic rather than cultural' does not explain why the dynastic domination failed to have a cultural expression. It also does not explain the genesis of his suggested 'pre-existing urban population'. Interestingly enough, Wheeler argues, on the one hand, that the Indus Civilization was too distinctive to be a colony of any alien group and suggests, on the other, that there was an alien, purely political, domination in the Harappan cities. Regarding the significance he attaches to the use of wood in burnt-brick construction of a defence tower and the granary at Mohenjo-daro, one may simply note that this is not an uncommon practice in modern India, particularly among the simpler type of burnt-brick constructions in the villages.

Gordon in 1958, did not have any doubt that there was a piecemeal migration of people from Elam and Mesopotamia to the Indus and, to him, the problem was merely to determine whether these people came by land or sea. He opted for sea.

> Theirs was not the civilization that had dragged its way slowly and painfully across Makran or Afghanistan in ox-carts, halting by the way and shedding under the impact of time and hardship much of its cultural superiority and efficiency. There is on the other hand evidence that it was the product of the stimulus of a new environment on knowledge which had undergone a sea-change. (Gordon 1958: 60).

Gordon does not make clear the nature of this 'evidence'. In 1956, Heine-Geldern wrote that, in the Indus context, one was confronted with 'colonial cities' (Heine-Geldern 1956: 81-99). In 1963, Kramer assumed that the Harappan Civilization owed its origin to the migration of an ethnic stock from Mesopotamia. According to him these immigrants were pre-Sumerian, Al Ubaid people who 'seeing their language, faith and way of life threatened and perhaps even suppressed ... went forth to a new land where they were free to live their lives in accordance with their religious convictions' (Kramer 1963: 114).

In 1964 Amalananda Ghosh put forward a hypothesis in two parts which may be examined separately. First, he postulated a homogenous pre-Harappan culture in Gujarat, Rajasthan, Sind, Punjab and Baluchistan and named it Sothi after the name of a site in the Drishadvati basin where the Kalibangan I pottery (pre-Harappan) was first recognized. The main basis of this part of Ghosh's argument seems to be a comparison in shapes and designs of the Kalibangan pre-Harappan pottery with that found in the relevant contexts elsewhere.

> The Sothi ware of Kalibangan is found to be analogous with the pre-defence (Periano Ghundai) pottery of Harappa and also with that of the earlier (pre-Harappan) period of Kot Diji ... Some of the designs ... are comparable with those on the Kili Gul Mohammad ware (semi-circles in horizontals with the intervening areas cross-hatched), Quetta ware (cross-hatched triangles, opposed triangles, double row of needles and fish), Jangal Coarse (radiating lines ending in solid discs) and painted (scales) ware and Sur Jangal III (op-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

posed triangles); analogies with Mehi, Nundara are also too considerable to be overlooked.

Ghosh also points out the occurrence of a Sothi-type ware in the deeper levels of Mohenjo-daro and the continuation of some Sothi pottery elements in the Harappan levels of some sites like Mohenjo-daro, Kalibangan, Ropar, etc. He argued that all these similarities need not be accidental and that at the base of the Harappan culture lies a 'firm Sothi substratum' (Ghosh 1964: 113-156).

This analysis that Ghosh made is important because he was the first to point out the ceramic similarities between different pre-Harappan sites and suggest a cultural continuum on that basis. His attempt was, of course, a limited one and not possibly enough to justify the postulate of a homogenous culture over such a wide area as Baluchistan, the Indus system and Gujarat. He did not study the local variations either.

In the second part of his argument, Ghosh seems to elaborate essentially on the Wheeler's framework. He begins by saying that the origin of the Harappan culture should be looked for within the earlier pre-Harappan culture itself and not outside it. He then visualizes within this culture 'a set of people with a receptive mind, perhaps led by a few genius-dictators, bent on an all-round improvement over existing conditions'. He further assumes that:

> They borrowed the idea of cities . . .and established cities of their own with a superior planning, may be with the intention of outdoing the Sumerians. To gain prosperity they would make them realize the need for standardization which they would give effect to in all directions. Over the existing foundations in the rich river plains would their ideas give rise to large cities controlled by inflexible authoritarianism. Within a limited population and under strong leadership, all such changes, vast as they are, could easily take place within a generation or two. (ibid.).

Logically, this part of Ghosh's hypothesis leaves much to be desired. First, he ignores the fact that no genius-dictator can bring about a basic qualitative social change in a society unless the society itself is internally ready for such a change. A 'genius-dictator' may hasten the process of change but he cannot stand outside the society and play the role of an arbitrary creator. Secondly, the sovereign ruler is the product of a class-divided civilized society. It is unlikely that the pre-Harappan society could generate a sovereign ruler or, as Ghosh calls him, a 'genius-dictator'. The illogicalities notwithstanding, Ghosh's hypothesis was the first of a chain of recent hypotheses which have tried to determine the relevance of the pre-Harappan levels.

Dales in 1965, laid emphasis on visualizing the entire history of the pre-Harappan groups into a number of phases with alphabetical designations. His 'Phase C' heralds the first discernible period of settled village life in the area extending from Mundigak in south Afghanistan to the Quetta and Zhob-Loralai areas in north Baluchistan and the Kalat area of central Baluchistan. This phase is characterized, by metal objects, progressive refinement of the stone-tool types leading to the development of a fine parallel-sided blade industry, ground alabaster bowls, crude humped bull figurines and a rich pottery industry. Settlements spread, in the succeeding Phase D, not merely to south Baluchistan (early phase of the Nal complex) but also to the Indus plain and north Rajasthan below and were generally characterized by the gradual elaboration and refinement of the earlier cultural items. With Phase E, one is supposed to be on the threshold of civilization witnessing the transition from villages to towns with fortified citadels (Kot Diji, also Mundigak in south Afghanistan) while Phase F represents the civilization itself (Dales 1965: 257-284).

Fairservis' attempt in 1967 was broadly similar. In his postulate of five stages covering the entire food-producing prehistoric cultural succession in Baluchistan and the Indus system, Stage IV has been designated as that of urbanization and a logical developmental connection has been suggested by him between this stage and the preceding Stage III. The evidence of Stage III, according to him, is widespread and covers the following areas: south Afghanistan (Mundigak III, Deh Morasi Ghundai), Baluchistan (Damb Sadaat II, Dabarkot, Sur Jangal III, Rana Ghundai III, Periano-Ghundai, Moghul Ghundai, Anjira IV, Kulli, Mehi, Nal, Ornach, Wadh, Drakalo, Edith Shahir, Niai Buthi), south-western Sind (Amri, Kothras Buthi, Tharro hill), lake Manchhar region (Pandi Wahi, Ghazi Shah), northern Sind and Kachhi plain (Gandava, Judeirjo-daro, Mohenjo-daro, Kot Diji), Bahawalpur (Bhoot) and Bikaner (Sothi, Kalibangan). The suggested chronology is between 2500 and 2300-2400 B.C. and the distinctive traits are supposed to be large sized villages, wide variety of copper-bronze pins,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

knives, axes (including socketed types), female and other types of terracotta figurines, compartmented seals, an elaborate system of potter's marks, alabaster vessels, diverse painted pottery types, open-based immovable bread-ovens and a 'very apparent' regionalization. (Fairservis 1967).

Of all these regional manifestations, Fairservis has chosen the one in northern Sind and Kachhi plain to call 'Early Harappan'. The basis of the argument is not quite clear, at least not in his 1967 publication. In 1971, he was more specific. 'In Kachi and north-eastern Sind there is increasing evidence for a local style which is in part derived from northern and central Baluchistan. This we might call the Early Harappan. By this we mean the Harappan artefact form and decoration, not the civilization' (Fairservis 1971: 221). According to him these artefact forms and decorations are the following:

> (1) unpainted clay bangles often squarish in cross-section; (2) characteristic Harappan figurines; (3) unpainted clay balls (rattles?); (4) plain pottery thicker in construction than Kot Dijian or Amrian, often with comb-incising; (5) globular vessels; (6) miniature vessels, unpainted; (7) Harappan painted motifs but drawn more crisply and finer than in the later mature phase; (8) Harappan-style dishes with a distinct break between the broad rim and the bowl of vessels; (9) pedestal vessels or dish-on-stand with rims painted black, often with black circle painted decoration on interior; (10) frequent occurence of Nal, Kot Dijian, and Amrian motifs in pottery painting; (11) toy carts, made with solid bodies. (ibid.).

Apart from trying to define an 'Early Harappan' horizon, largely on the basis of surface finds, Fairservis also tried in 1971 to isolate three theoretical factors behind the growth of the Indus Civilization. The first one is what he calls 'the outside-influence factor'. The basic idea is an assumption that there was an 'important diffusionary movement overland from southern Mesopotamia and Khuzistan' during the early dynastic period and that this spread had a determining influence on the Kulli culture and 'undeniably' on the Indus Civilization. The second factor was the 'subcontinental setting', a setting which possessed considerable 'subsistence advantages'. The third factor is called the 'social readiness for civilization'. It is less easy to define, but the basic idea is that the highland villages in the valleys of Baluchistan had already an established socio-economic, cultural and organizational network of their own. When the transition to the Indus plains took place, this network was 'extended by degrees with consequent shifts of population according to the successful settlement of region after region'. This meant that the links between the different regions were not broken nor did they lose touch with the highland setting as the expansion of settlements in the valley went on. In Fairservis' argument:

> the urbanization process so necessary to the definition of a civilization would appear to have come about as the inevitable result of the direction already taken by the villagers of the borderlands. What was lacking in the highlands was the space and the natural resources to stimulate the process. In the Indus both were at hand. With little technological innovation but with an already largely established hierarchical system the organization necessary to handle the problems of settled life in the valley was created.

These postulated 'phases' (Dales) or 'stages' (Fairservis) are no doubt useful devices to understand the cultural growth process in Baluchistan and the Indus valley. Their basic limitation is that the comparative stratigraphy between the sites they mention, is hardly adequate to allow the data to be sorted out in any precise fashion. To take an instance, Faireservis includes pre-Harappan Amri, Kot Diji and Kalibangan in his Stage III but it is clear that the pre-Harappan level of Kalibangan is decidedly much later than the pre-Harappan level of both Amri and Kot Diji. In fact, one may reasonably argue that, when the pre-Harappan settlement came up at Kalibangan, the Indus Civilization was already in existence in Sind. Secondly, Fairservis' idea of an early Harappan period in north-eastern Sind and Kachhi plain is based on his study of surface collection from that area and need not carry much weight for this reason alone. Moreover, the artefact-features which he attributes to this phase, are a few pottery and terracotta types which hardly justify the label 'Early Harappan'. While evaluating Fairservis' 'outside-influence factor' one should note that the recent discoveries in south-eastern Persia do not support the idea of an 'early dynastic' cultural diffusionary wave breaking in ripples in the Baluch hills. As far as his emphasis on the factor of social readiness is concerned, one doubts very much if the organizational network established in the Baluch villages was adequate in any sense of the term to cope with the large scale problems of settlement in a wide river-valley. There is not much point in over emphasizing the nature of settlements like Damb Sadaat III and Edith Shahir in this respect because these settlements might well be contem-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

porary with the Indus Civilization. And, if they were so, the apparent complexity and affluence of these settlements may be ascribed to their participation in some form or other in the network of the Indus Civilization.

The Allchins in 1968 agreed broadly with Ghosh in seeing the 'continuity from pre-Harappan to Harappan times' in the Indus Valley as 'suggesting that a large if not a major element in the Harappan civilization must derive from the pre-Harappan culture of the Indus valley itself' and as constituting the 'formative stage' which led from the village to the first Indian cities. They also pointed to the many cultural resemblances between the pre-Harappan sites of the Indus Valley and suggested that there was already a considerable cultural uniformity in the area. According to them, there were three sub-regions of the pre-Harappan culture province: the central, including Kot Diji, Harappa and possibly Mohenjo-daro; the southern or Amri with ties with south Baluchistan and the eastern or Kalibangan, with hypothetical affinities further east (Allchins 1968: 123-25). This hypothesis has been subsequently supported by Mughal's detailed study of the material from the area.

Rafiq Mughal, in 1970, tried to define an early Harappan horizon in the Indus and the Ghaggar-Hakra systems or what he calls the Greater Indus Valley, and north Baluchistan (Mughal 1970). Terminology — the applicability of the terms like pre-Harappan, early Harappan or early Indus—is not particularly important. But what is important is that there was a cultural continuum with a good deal of shared traits in both north Baluchistan and the Greater Indus Valley. Mughal systematically considered the mass of data from all the relevant excavated and unexcavated sites and added considerable precision to them in cultural terms. Possibly the most important part of Mughal's analysis from the point of view of the origin of the Indus Civilization, is his comparative analysis of 'Early Harappan' material remains and their distributional patterns in the Greater Indus Valley. The items considered are not merely pottery (which he considers in detail taking into account both the similarities and dissimilarities and defining the different areas of distribution of Amri, Kot Dijian and Sothi or Kalibangan wares) but also every other available cultural item — architecture, terracotta, metallurgy, stone tools and technology, graffiti and fauna. In north Baluchistan, he first studies the data in terms of internal comparative stratigraphy and then showed how this area was linked externally with south Afghanistan and the associated areas beyond. Comparing the north Baluchistan material with the Greater Indus Valley 'Early Harappan' assemblage, he found close cultural interrelationships between the two regions. The importance of north Baluchistan as the link with the West seems to have ceased with the beginning of the Indus Civilization, and this role seems to have shifted to south Baluchistan. Mughal also points out that, towards the end of the 'Early Harappan' period, there was an increase in population both in north Baluchistan and the Greater Indus Valley.

In answer to the query 'how did the final change to urbanization come about?' Mughal writes:

> We already have the evidence of fairly large towns along the river valleys, fortifications, knowledge of stone and metal technology reflecting specialized craftsmanship, wheeled means of transport, trade of lapis lazuli with outside regions and an emerging system of writing. Only two elements of urbanized society are lacking: (i) large cities like Mohenjo-daro, Harappa and Kalibangan, and (ii) increased specialization to engage in full time crafts like seal-engraving, sculpture, modelling and metallurgy which in turn were related to increased access to raw material or means of obtaining them and availability of resources to support craftsmen not directly involved in subsistence activities. During the Early Harappan period in the Greater Indus Valley, we see that the processes leading to such an intensification, increased craft specialization, and class stratification were already in progress. The Mature Harappan culture, therefore, was the ultimate result of these processes. (Mughal 1973).

Thus, since 1964 when Ghosh put forward his idea of a homogenous pre-Harappan culture, there has been an increasing emphasis on the earlier village-base of the Harappans. Dales and Fairservis tried to understand this antecedent rural history in terms of a number of 'phases' or 'stages'. Both these attempts, like that of Ghosh, were based on a limited examination of the data and thus open to doubt. Mughal's work is much more detailed and there is no reason to doubt his basic premises about what he designated as the 'Early Harappan' phase in the Indus system and north Baluchistan. There is also little doubt that this phase must have contributed substantially to the Harappan make up of which we do not have any clear idea at present except the occurrence of a few Harappan artefact types associated with it. In fact, even the occurrence of these Harappan

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

artefact types in the 'Early Harappan' level is not quite clear. As Gupta (1972) has pointed out, traits like terracotta cakes, fish-scale design, etc., in an 'Early Harappan' context, may very well be due to a full-fledged Harappan contact. At Kot Diji, level 9 may be dated by radiocarbon around 2350 B.C., the radiocarbon date of the beginning of the Harappan culture. Terracotta cake occurs in Kot Diji level 7 and the fish-scale design occurs in its level 6. In other words, the occurrence of these traits at Kot Diji was possibly due to a Harappan contact, though at this site itself, the appearance of the full-fledged Harappan culture was not before its level 3A. (Gupta in Manchanda 1972: 394-405). In a different context, the present author emphasized:

> In an impressionistic view, the pre-Harappan villagers may be said to have introduced in the Harappan distribution belt the following technologico-economic features: an extensive use of wheels, a limited but developed knowledge of copper-bronze, a plough-based cultivation along with a knowledge of locally cultivable crops, the use of durable building materials, the laying out of a nucleated settlement within walls, the turning out of a wide variety of terracotta and stone objects, a good deal of regional interconnection, an undetermined quantum of external trade contacts, etc. (Chakrabarti 1972-73: 29).

In fact, this supposition is not particularly different from that of Mughal cited earlier. Agrawal argued that the pre-Harappan settlers could well be the rural facies of the Indus Civilization (Agrawal 1972-73: 37-41). Though they were partly contemporary with the Harappans, there is no evidence to support Agrawal's contention.

The problem of the origin of the Indus Civilization, however, still remains. Did the pre-Harappan (or Early Indus or Early Harappa) technological and economic base lead by itself to the Indus Civilization — its grid-patterned cities, often with 'citadels' separated from the 'lower town', extensive copper-bronze metallurgy, monumental architecture, elegant craftsmenship in stone, wide trade contacts, elaborate systems of weights and measures, and the art of writing— were different both in scale and quality, from everything that was achieved in the Indus system earlier. One may call the earlier level 'pre-Harappan' or even 'Early Indus' (Dales 1973: 162-163), because it may be more logical at this stage to keep the issue of the nature of its relationship with the succeeding Harappan level open. The term 'Early Harappan' seems to imply that this stage led by itself to the stage of civilization. This possibly is something which the data do not admit at present.

About the grid-planning, Stanislawski pointed out, long ago, that it was possible 'only in a totally new urban unit or a newly added subdivision' (Stanislawski 1946: 105-120). It was not conceivable except as an organic whole. This grid-plan cannot be explained by referring to any pre-Harappan settlement. At Kalibangan (Mound I) even the orientation of houses, in the pre-Harappan level, differed from that of the Harappan houses. Regarding technology, it should be noted that copper objects are rather rare in the pre-Harappan assemblage with no definite proof of copper-smelting. When one contrasts this with the elaborate metal inventory and developed metallurgical process of the Harappans the comparative suddenness of the Harappan metal tradition becomes apparent. Some amount of emphasis has been placed by Mughal on the occurrence of graffiti from Jalilpur, Kalibangan and Amri as a sort of antecedent stage of the Harappan writing. As a cultural proposition, it is not worth anything because, as Mughal's discussion itself shows, their number is extremely limited. And, moreover, there is no similarity between a graffiti and an Indus sign. Also, there is no block formation of signs in the graffiti. The Harappan sculptural and bronze artistic tradition, though limited, suggests a maturity and sophistication which cannot be explained by anything pre-Harappan.

Even if one assumes that the 'Early Harappan' base led by itself to the civilization, at least two phenomena remain which are difficult to explain, as Gupta (1977) has rightly pointed out. How is it that at sites like Amri, Kot Diji, Gumla and Kalibangan the 'Mature Harappan' level does not smoothly and imperceptively succeed the 'Early Harappan' level? At Amri there is a transitional phase where the typical Amri and the typical Harappan elements are found together. At Kot Diji, and also Gumla, there is burnt deposit separating the two and, at Kalibangan, the Harappan level is a clear, equally unrelated superimposition on the earlier level, after an earthquake, perhaps. There is also a 'layer of destruction' between Periods III and IV at Gumla; Period IV being Harappan (Dani 1970-71: 167). Secondly, it was pointed out by the Allchins, in 1968, and recently emphasized by Lambrick, that the 'Early Harappan' settlements are not on

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the active flood-plain of the Indus. Even Amri lies on the edge of the plain and Kot Diji is on an outlier of the Rohri range of the hills. As Lambrick cogently puts it, 'the decisive step forward in the context of Sind was the building of a town well out on the flood-plain' (Lambrick 1973: 2-3).It seems that this decisive step was taken by the 'Mature Harappans' and not by the 'Early Harappans'. In the present stage of knowledge none of these two problems can be satisfactorily answered, although Gupta (1977) has made strong plea in favour of his 'leadership in periods of crisis' theory.

In fact, from whichever way one views it, the primary available impression is that the Harappan Civilization, in the expressive phrase of the Allchins, 'burst out suddenly and brilliantly'. This, however, is in no way to deny the role the pre-Harappan cultural continuum must have played in the Harappan genesis. It is only that our understanding of the actual genesis is incomplete, if not entirely non-existent. At one point, Mughal compared his 'Early Harappan' phase to the Ubaidian phase in Mesopotamian archaeology. Mughal could have added that metallurgy was far more developed in the Ubaidian phase than it was in the 'Early Harappan'. But in one sense, the comparison may be valid because it is from the Ubaidians that the growth process, leading to Early Dynastic Sumer, may be traced just as the 'Early Harappan' cultural continuum acted as a base for the subsequent 'Mature Harappan' growth. But what Mughal ignored is an elementary fact that, in Mesopotamia, the Ubaidian phase did not directly end in the Early Dynastic period; there were the levels of Uruk in between. The Ubaidian phase began about 4350 B.C. (radiocarbon) and it is only by Uruk level IV dated 3300-3100 B.C. (radiocarbon) that one gets the indices of the urban revolution including writing. The Mature Sumerian Civilization does not begin till the Early Dynastic period around 2800 B.C. In the Indus context, 'Early Harappan' begins around 2800 B.C. (radiocarbon) and ends in the 'Mature Harappan' period dated 2400 B.C. (radiocarbon). One may add that this is Mughal's uncalibrated, radiocarbon chronology. In a subsequent publication (Mughal 1974: 107) he cites calibrated dates and pushed back his 'Early Harappan' to 3200 B.C. But he prefers to accept the archaeological date of 2500 B.C. for the 'Mature Harappan' ignoring the calibrated dates which would have put it around 2800 B.C. Basically, it is a sequence of only 400 years, an incomprehensively short period in the light of development in Mesopotamia. The problem is: how does one explain it? Mughal himself seems to come round to this argument when he writes, in 1973:

> On present evidence, the mature Harappan culture at early Indus or Harappan sites arrives with a fully developed mature culture. Does this sudden change mark a major shift in the socio-political structure of the Indus people? If so, what were the circumstances in which such a change occurred? At present, we have no evidence to answer these pertinent questions. (Mughal 1973: 15).

The possibility that the process of change from the pre-Harappan rural base to the Harappan Civilization was 'basically in the social-institutional sphere, giving the earlier village horizon a new, qualitatively different dimension' was also suggested by the present author (Chakrabarti 1972-73: 30).

According to Lamberg-Karlovsky (1972: 229) 'the explosive situation traditionally agrued for the Harappan culture' is misleading. As far as the present evidence of the internal Harappan growth is concerned, there is nothing misleading about this notion. The important point in Lamberg-Karlovsky's argument, however, is the emphasis he puts on the significance of sites like Tepe Yahya and Shahr-i Sokhta in south-east Persia which had control over certain natural resources and were either manufacturing or distributing centres of finished products based on those resources (steatite at Tepe Yahya, and lapis lazuli and alabaster at Shahr-i Sokhta). The demand-and-supply relationship which this region had with Mesopotamia must have provided the basic economic base of urban growth at these sites and, 'as in a systems feedback', contributed to the urban growth process in Mesopotamia also. Because of an established pre-Harappan trade network with this region, the Indus system also could have been influenced by this process, like Mesopotamia. This hypothesis thus focusses attention in the Indus context on the nature of the relationship between the pre-Harappan level and what Lamberg-Karlovsky and Tosi (1973: 21-53) call an 'early urban interaction sphere' established around 3000 B.C. in Turkmenia, Seistan and south Afghanistan. This is an aspect which deserves careful consideration in the course of future researches.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

An easy way to explain the present suggestion of an explosive evolution of the Indus Civilization would be, as it has so often been in the past, to invoke the factor of external stimulus, be it from Mesopotamia or from anywhere else. Thapar (personal discussion) and Lambrick (1973: 2-3) have even gone to the length of suggesting Judeir-jo-daro as a probable place where this stimulus might have had an early shape. One may only note that invoking external stimulus in a vague, undefined way absolves the archaeologist of any responsibility to explain or look for culture-change in internal terms in any situation where the data are inadequate. As Renfrew has put it:

> This problem of establishing whether a specific innovation was learnt by a particular community through contact with its neighbours, or developed locally without such stimulus, interesting as it is, has only served to obscure more fundamental ones in the explanation of culture change . . . .In order to explain changes in culture, in the organization and life patterns of particular communities, the genesis of specific innovations is not the fundamental problem. More central is to explain how and why innovations of one particular kind came to be accepted at that time and at that place, where previously the community did not take to them. Such an explanation may require information about the entire functioning of the community–its subsistence, its demography, its social organization and so forth. (Renfrew 1973: 437).

There will be no meaningful insight into the Harappan growth process till the research on pre-Harappan and Harappan levels is much more detailed and problem-oriented than what it is now. Till then, invoking external stimulus will be as inadequate a culture-explanation as suggesting a straight causal relationship between the pre-Harappan and Harappan levels on the existing evidence.

ACKNOWLEDGEMENT

Grateful acknowledgement is due to Dr. F.R. Allchin who gave his comments on the first draft of the paper.

REFERENCES

Agrawal, D.P. 1972-73. Genesis of Harappa Culture. *Puratattva*. No. 6; 37-41.

Allchin, B. and Allchin, F.R. 1968. *The Birth of Indian Civilization*. Hammondsworth; 123-125.

Chakrabarti, Dilip K. 1972-73. Concept of the Urban Revolution and Indian Context. *Puratattva*. No. 6; 7-32.2.

Coulborn, R. 1959. *Origin of Civilized Societies*. Princeton; 26.

Dales, G.F. 1965. A Suggested Chronology for Afghanistan, Baluchistan and the Indus Valley. In *Chronologies in Old World Archaeology*. R. Ehrich ed. Chicago; 257-284.

———. 1973. Archaeology and Radiocarbon Chronologies for Protohistoric South Asia. In *South Asian Archaeology*. N. Hammond ed. London; 162-163.

Fairservis, W.A. 1967. *Origin, Character and Decline of an Early Civilization*. New York.

———. 1971. *The Roots of Ancient India*. London.

Ghosh, A. 1965. The Indus Civilization: its Origin, Authors, Extent and Chronology. In *Indian Prehistory: 1964*. V.N. Misra and M.S. Mate ed. Poona. 113-156.

Gordon, D.H. 1958. *Prehistoric Bakcground of Indian Culture*. Bombay.

Gupta, S.P. 1972. The Dichotomy of Harappan and Pre-Harappan Cultures. In Omi Manchanda, *A Study of the Harappan Pottery*. Delhi; 395-405.

Heine-Geldern, R. 1956. The Origin of Ancient Civilizations and Toynbee's Theories. *Diogenes;* 81-99.

Kramer, S.N. 1963. Dilmun: Quest for Paradise. *Antiquity*. Vol.37; 114.

Kroeber, A. 1940. Stimulus Diffusion. *American Anthropologist*. Vol.42; 1-20.

Lamberg-Karlovsky, C.C. 1972. Trade Mechanisms in Indus-Mesopotamian Interrelations. *Journal of the American Oriental Society*. Vol.92; 229.

Lamberg-Karlovsky, C.C. and Tosi, M. 1973. Shahr-i Sokhta and Tepe Yahya : Tracks on the Earliest History of the Iranian Plateau. *East and West*. Vol.23; 21-53.

Lambrick, H.T. 1973. *Sind before the Muslim conquest*. London.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro*. Vol.I. Delhi.

Marshall, John 1931. *Mohenjo-daro and the Indus Civilization*. Vol.I. London.

Mughal, M.R. 1970. *The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan*. Unpublished Ph.D. dissertation; University of Pennsylvania.

———. 1973. *Present State of Research on the Indus Valley Civilization*. Karachi.

———. 1974. New Evidence of the Early Harappan Culture from Jalilpur, Pakistan. *Archaeology*. Vol.27; 107.

Piggott, S. 1950. *Prehistoric India*. Hammondsworth.

Renfrew, A.C. 1973. Discussion on G. Daniel: Elliot Smith, Egypt and Diffusionism. *Symposium of the Zoological Society of London*. No. 33; 437.

Stanislawski, D. 1946. The Origin and Spread of the Grid-pattern Town. *Geographical Review*. Vol.36; 105-120.

Wheeler, R.E.M. 1953. *The Indus Civilization*. London.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

5

F.R. Allchin

The Northern Limits of the Harappan Culture Zone

It is, I believe, now firmly established that the culture stage which precedes the Mature Harappan at a whole series of classic sites in the Indus Valley, and which is variously known as 'Kot Dijian', 'Pre-Harappan' and 'Early Harappan' or 'Early Indus', must be seen as the incipient stage of the Indus Civilization itself. As such it has been argued by several writers, following Mughal (1970) and Fairservis (1971), the terms Early Harappan (or, as we would prefer, Early Indus) seem more appropriate than 'Pre-Harappan'. In the tenth Mortimer Wheeler lecture in London in October 1980, I suggested that the time had come when the latter term might well be discarded in this context (Allchin; in press).

If we take as criteria, for the extent of the Early and Mature Harappan cultures, the characteristic style of the pottery and other common artifacts of the two stages, we are struck by the apparent discrepancy of their distributions, particularly in the north. This discrepancy is even more clearly highlighted by the inclusion, in the Mature Harappan series of only those sites where recognizable inscriptions or seals have been discovered. The present paper seeks to discuss some recent additions to knowledge, bearing on this problem, derived from the work of the Cambridge University Archaeological Mission to Pakistan (re-named the British Archaeological Mission to Pakistan in 1981) during two seasons' work in the Bannu basin, in collaboration with the Department of Archaeology of Peshawar University and, more recently, the first season of a new project on the Potwar plateau, in direct collaboration with the Department of Archaeology of the Government of Pakistan.

Archaeologists are all too often faced with the situation where there are insufficient data from which to attempt to make a uniformly solid reconstruction of cultural events in the past. In such circumstances, it is peculiarly dangerous to argue from the negative: for instance an apparently significant gap in a distribution map may be transformed by the discovery of even a single site. In looking therefore, at the evidence for the northern limits of the Indus Civilization, we must be prepared for unexpected discoveries to overturn the picture as it appears today. Nevertheless, we believe, the present picture is suggestive of something, and hence it seems worthy of a brief comment.

The available evidence for the Early Indus stage is derived from excavations and surface collections. The excavated sites are still backed by far too few (and apparently inconsistent) radiocarbon dates to provide an altogether convincing chronology. To the west of the Indus, the picture is reasonably clear: there is a group of sites in the Dera Jat which show at least two stages. The first is represented by Gumla 2 - 3 and Early Rahman Dheri, showing some 'Kot Dijian' traits of pottery, but with an accompanying polychrome painting style with a distinctly local character. This period is dated by radiocarbon at Rahman Dheri from *c.*3300 to 3160 B.C. (MASCA calibration). The second stage is represented by Late Rahman Dheri in which the pottery is almost entirely 'Kot Dijian'. This stage is dated by radiocarbon at Rahman Dheri from *c.* 2600 to 2480 B.C. (MASCA

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

calibration). Further north, in the Bannu basin, the same two stages are in evidence. The latter represented at Tarakai Qila by some 4 to 5 metres of deposits, and unaccompanied apparently by the earlier component, is dated—somewhat unexpectedly—by radiocarbon between *c.* 2700 and 2100 B.C. (MASCA calibration). Six other sites of
5 this period have been reported from surface collections in the Bannu area. No Early Indus sites are known to the north of the Bannu basin on the west bank of the Indus.

East of the Indus the site at Musa Khel is reported to produce Early Indus materials, but has not yet been excavated. However, this is at present a lone example, and the next site or group of sites—moving eastwards—are both far away. To
3 the north there is a small cluster around Sarai Khola. This site alone has been excavated and published so far, and shows (I) earlier 'Neolithic' occupation, followed by (II) and Early Indus occupation. There are five or six other sites in the neighbourhood belonging to this Early Indus stage. No radiocarbon dates are as yet available, although two of the sites, Jhang and the recently discovered Hathial at Taxila (discovered by my wife and myself during our field work in February 1980), have now been excavated. Almost equally far to the south lies Harappa, till now apparently in splendid isolation. The potentially most important Early Indus occupation at this site is still known only from the small area excavated by Wheeler in 1946. There is, thus, a very considerable area of the Punjab in which one would expect to find Early Indus sites, north of a line from Musa Khel to Harappa.

Farther east again, a number of sites of the Early Indus period are reported in the Sarasvati and Drishadvati valleys and on the Indian side of the frontier as far north as Ropar. Several have been excavated, most notably Kalibangan, where radiocarbon dates suggest a span of *c.* 2900 to 2550 B.C. (MASCA calibration) for the Early Indus stage. Thus, on present showing, there is a considerable area north of Bannu–Musa Khel–Sarai Khola–Harappa–where no Early Indus sites have so far been reported. Judging by the vague resemblance of the 'Neolithic' pottery of Sarai Khola to the earliest pottery of Swat (Ghaligai I) and Kashmir (Burzahom I), one may expect that, in this area, an earlier style of pottery, and perhaps culture, survived and that the Early Indus culture and its attendant styles of craft did not extend there.

A possible exception to this may be the appearance of painted pottery in Ghaligai II and related sites of Swat (Loebanr III, Aligrama and Bir Kot Ghundai, and of stray examples from Burzahom of pottery of a distinctly 'Kot Dijian' character among the grey wares which otherwise characterize the early stage there.

The Mature Harappan picture is noticeably different. West of the Indus a site is reported some 4
miles south of Dera Ismail Khan (information from F.A. Durrani). There is a Mature Harappan element in Period IV of Gumla, and the 'industrial' site of Hisam Dheri, next door to Rahman Dheri, produced large numbers of terracotta cakes which are claimed as a Mature Harappan trait. But as far as present evidence goes, and in particular if the presence of seals or other Harappan inscriptions be applied as criterion, there are no Mature Harappan sites to the west of the Indus, north of Dera Ismail Khan. Indeed the late radiocarbon dates for the upper levels of Tarakai Qila suggest on the contrary, that the Early Indus style may have continued without major modification down to *c.* 2000 B.C. in this area.

A similar state of affairs prevails east of the Indus. The Musa Khel site is reported to have produced a Harappan seal (information from M. Halim), thus carrying the distribution to a northern limit. Thence, northwards, no Mature Harappan sites are currently known. Around Taxila there are now no less than six sites of the Early Indus, but not a single Mature Indus site. There is here too a suggestion (which will only be resolved when radiocarbon dates are available) that the 'Kot Dijian' passes through at least two phases, an earlier and a later, and thus it may well be that the final stages of the 'Kot Dijian' style in this area too will be found to extend down to the final years of the third millennium.

It is only when we reach Harappa and the areas 4
to its south and east (broadly the Sarasvati and Drishadvati valleys) that we once again begin to encounter Mature Harappan sites, and even here it would seem that these are scattered among more numerous sites at which a regional Early Indus style survived. East of the Yamuna, a related regional style becomes even more prominent and the easternmost Mature Harappan site, Alamgirpur appears again in isolation.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

If the analysis of the foregoing paragraphs is correct, it seems to reveal a curious problem: that there are areas along the northern fringe of the Mature Indus culture-region where an Early Indus style (admittedly as indicated principally by pottery) became established, but where the Mature stage for some reason never penetrated. It may be that both the Bannu basin and Potwar plateau should be seen as already islands of Early Indus settlement in a larger unsettled area, but the fact remains that in neither is there any trace of a succeeding Mature phase. We may thus enquire what may the reason for this be?

At the outset it must be admitted that we are still very much in the dark as to what were the causes of the change from Early to Mature Indus style in the central Indus Valley region itself. Our personal view would be that the search for some area outside from which to derive the Mature Harappan ready-made, to supersede the Early Indus style, is a chimera. At base, the Mature style must have evolved out of the Early in the Indus Valley itself, implying continuity of population and technical skills, and probably recognizable more particularly by the introduction of such important innovations as writing and all the implicit concomitants of political, administrative and social organization. Such, one might suggest, is the model indicated by the equally distinctive style of the Mughals in later times. This does not, of course, exclude the possibility of some external stimuli or influences, taking the form of the introduction of new ideas or techniques adopted by the communities of the Indus plain. What else did it entail? It is possible that some external military and political force was involved, although at present there is no positive evidence for this. It is also possible that other innovations or discoveries of a basic kind were involved. For example, it may be that there was some major innovation in the system of food production and agriculture, etc. There are indeed certain positive indications of a change in the basic organization of agriculture and food production, though not necessarily in the actual elements involved. This is demonstrated by the change to a much more narrowly specialized (professional?) production of parallel-sided blades to the exclusion of other lithic artefact forms in the major settlements at the beginning of the Mature Indus period. Previously the more varied lithic tool-kit employed appears to indicate a wider range of functions such as might be associated with mixed farming, hunting, etc. Now the new and more limited range of forms suggests their employment for domestic and urban functions, and possibly the harvesting of cereal crops (Allchin, B. 1979).

Yet when all is said and done, we must return to the idea that there was a local evolution of the Mature Harappan culture with its distinctive style in the Indus Valley itself. This evolution is everywhere apparent in the basic aspects of the culture, pattern of settlements, crops and agricultural life, and in the basic crafts involved. It is often less obvious in the 'superstructural' aspects, although even there it is in evidence in some important features. If it be objected that the change of style from Early to Mature Harappan rules out the possibility of a continuous evolution, we would reply that the Mature Harappan style was the special product of the cities which lay at the core of the whole society, and that it may well be that certain outlying regions which had been loosely involved in the Early Indus spread or convergence of culture may have been left out, for one reason or another, from the direct influence of this new Mature Indus urbanism. Thus the Mature Harappan style may be seen as one of the products of the development of cities in the Indus region.

We may now enquire what are likely to have been the reasons which excluded at least these two northern regions from the transformation which took place on the Indus plains. Certain possible causes, or contributary causes, come to mind:

(a) *environmental:* that both the Bannu basin and Potwar plateau enjoy a more rigorous climate with notably colder winters than does the Indus heartland; and in neither would the pattern of inundation, which appears to have been the basis of the intensive agriculture of the Indus heartland, have been operative, so that in both there would have been a fundamentally different agricultural regime, depending upon rainfall and a quite different system of irrigation.

(b) *economic:* that neither region offered raw materials which were in demand in the Indus heartland and thus (in contrast to Shortugai in the Oxus basin) were not seen as meriting Mature Indus colonization;

(c) *political:* that there was an active opposition from the local population to attempts to impose by military or other means Mature Harappan control over these areas. An ingenious, if still unproven, hypothesis has recently been advanced linking the 'industrial' site of Hisam Dheri with a Harappan siege camp, attempting, apparently unsuccessfully, to bring Rahman Dheri into subjugation. (Allchin, B., in press).

To us it would seem that any or all of these causes might operate as disincentives to Mature Indus colonization in these two areas; in particu-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

lar, the impossibility of practising the peculiar and relatively specialized system of intensive, inundation-based agriculture present in the mature phase on the plains, may have offered a strong disincentive, scarcely if at all felt, in earlier times when the initial Early Indus colonization of the Potwar and Dera Jat took place. In these circumstances, it seems quite to be expected that the Early Harappan style should have continued without break or change in areas which were, for whatever reason, cut-off from the stimulus offered by the development of the mature urban society.

REFERENCES

Allchin, B. 1979. Stone Blade Industries of Early Settlements in Sind as Indicators of Geographical and Socio-economic Change. In *South Asian Archaeology 1977*. M. Teddie ed. Naples; 173-211.

———. Substitute Stones. Paper read at the Seminar on the Harappan Civilization, Srinagar. July 1979 (in press).

Allchin, F.R. Antecedents of the Indus Civilization. Tenth Annual Mortimer Wheeler Lecture; The British Academy. London; October 1980 (in press).

Fairservis, W.A. 1971. *The Roots of Ancient India*. New York.

Mughal, M.R. 1970. The Early Harappan Period in the Greater Indus Valley and North Baluchistan. Unpublished Ph. D. Dissertation, Philadelphia: University of Pennsylvania.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

6

B.B. Lal

Some Reflections on the Structural Remains at Kalibangan

A little over thirty years ago when the spade went once again into action at Harappa, an altogether new chapter was added to our knowledge of the Indus Civilization: it was the identification, in unequivocal terms, of a system of fortification around Mound AB (Wheeler 1947), although guesses had been made earlier as also doubts expressed about its likely existence. Wheeler's excavations revealed that a mud-brick wall, with a basal width of about 14 m and rising, with a taper, to a height of over 12 m, went round the mound. It formed a rough parallelogram on plan, enclosing an area 360 × 180 m approximately. It was provided with a burnt-brick revetment on the exterior and reinforced with towers and salients at regular intervals. Although not much area was excavated by Wheeler on the inner side of the fortification-wall, it was, nevertheless, observed that the structure on the interior stood on a fairly high mud-brick platform.

The discovery of a system of fortification around *a part* of the settlement of Harappa, however, led to various theories regarding the social, religious and political organization of the Indus Civilization as a whole. The subsequent evidence of a fortification-wall, with towers, etc., around the Stupa Mound at Mohenjo-daro was taken to fall in line with that from Harappa. Although no clear-cut plans of the structures on Mound AB at Harappa were identified, so as to throw light on their nature or purpose, the presence of the Great Bath, a granary, a pillared hall and other monumental buildings on the Stupa Mound at Mohenjo-daro was interpreted to show that both these mounds constituted the 'Citadel' at their respective sites, from where a religio-civic government, headed by a 'priest' or 'priest-king' was run.

So far so good. However, while examining the military aspects of the Indus Civilization and not discovering any evidence about warlike equipment—such as large swords, armours, shields, helmets, etc.—nor finding anything specifically strategic about the location of these so-called 'citadels', a learned scholar sought to find an answer to the existence of these fortified components of the Harappan settlements in the following postulate (Mate 1970):

> This emphasis becomes more pointed when the nature of the buildings within the citadels is taken into consideration. There were the residences of the God, of the Priest and the King. Of equal importance were the store-houses or granaries which might represent the town's wealth. This grain might actually represent, as in ancient Egypt, the taxes paid by the cultivators to the government, whether priestly, princely or aristocratic. Following the same analogy, these places might represent well protected government headquarters either central or provincial. The protection might be from local population which in a crisis might wreck its wrath and displeasure on the rulers and their treasury. In times of famine these treasuries would become the first target of the destitute and it was ordinary common sense to protect them; that is how the citadels grew up in West Asia. To use another expression, it could be a normal police measure aimed at internal security.

It is against this background that we might consider the structural evidence from Kalibangan in some detail and assess if and how far the inferences of Mate hold good.

The site of Kalibangan is located on the southern bank of the now-dry Ghaggar river in the Ganganagar district of Rajasthan. The land around is flat, with low sand-dunes not very far

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

away. However, in the heyday of the Harappan settlement, when the river flowed past it, the land must have been full of lush fields. The sand-dunes, evidently of subsequent origin, are now gradually receding or even disappearing because of the spurt in agricultural operations resulting from the laying of a wide canal through the ancient river-bed.

In such a setting stood the ancient township of Kalibangan, with its two conspicuous parts, a smaller one on the west and a bigger one on the east (**fig. 6.1**). Following the pattern of nomenclature already adopted in the case of Mohenjo-daro, these two parts have been called respectively the 'Citadel' and the 'Lower Town', although as would be argued later, there is a case for altering such names, since they have led to functional and socio-political misinterpretations. (At Kalibangan, two more units have been noted to which also a reference will be made later in the course of the discussion.)

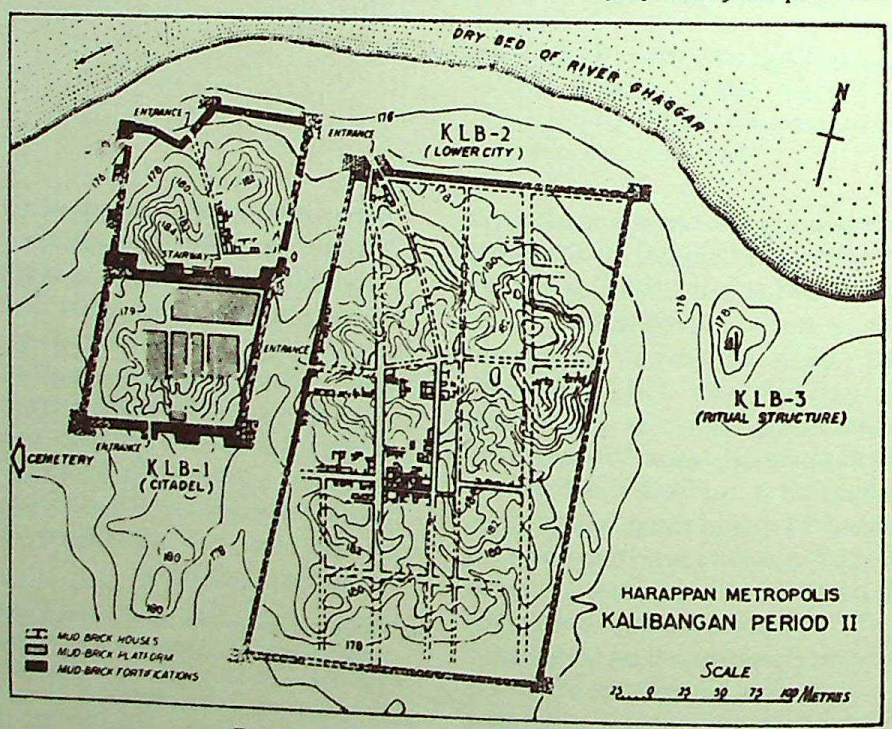


Fig.6.1. Kalibangan: Plan of structural remains

For siting the 'citadel', the Harappans made use of the elevated ground provided by the remains of an earlier settlement. This pre-Harappan habitation had its own fortification-wall which, it may be noted, was also incorporated at places in the Harappan fortification. It was particularly so, on the western and northern sides, while on the eastern and southern sides, the Harappan outline was conditioned by the conceptual lay-out of the 'Citadel'-complex as a whole.

This 'Citadel'-complex was not just one unit, with a single outline, but consisted of two juxtaposed parts, a southern and a northern. Each part was in the form of a rhomb, measuring 120 × 120 m and enclosed by a fortification-wall with salients and bastions. Since the two parts were juxtaposed, there was naturally a common wall in between. In the case of this bipartite wall, however, it may specially be pointed out that the two central salients projected into the area of the northern rhomb and not into that of the southern. This clearly indicated that the bipartite wall constructionally belonged to the southern rhomb and not to the northern. Likewise, the towers at the north-eastern and north-western ends of the bipartite wall showed that these were integral with the fortifications of the southern rhomb. All this goes to suggest that the southern rhomb represented the main part of the 'Citadel'-complex, whereas the northern rhomb, though conceptually and functionally integral with it, was at least structurally an adjunct. This hypothesis is also borne out by the kind of structures located in the two parts.

Although nature and man have both managed to cause tremendous damage to the ancient remains, yet it is clear that the southern rhomb

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

contained primarily a series of mud-brick platforms, separated one from another, as also from the back of the fortification-wall, by means of streets or lanes. Of these platforms, at least five were duly identified during the excavations and there is a likelihood of another three or four having existed in the area which has either been denuded or not yet excavated. It is important to note that there were no residential houses within the southern rhomb.

Access to the top of these platforms was had by means of a flight of steps or ramp some remnants of which were discernible. But of what the platforms carried atop not much detailed evidence was available due to the spoliation that has gone on for ages. Nevertheless, there were reasonable indications about their nature and purpose.

Thus, atop one of the platforms was located a
6 series of what have been termed as 'fire-altars' in the absence of a more suitable name. Although these are partly damaged, it would appear that their number was seven—a number which surprisingly remained sacred in India all through the ages and is so even today.

The 'altars' were in fact clay-lined pits, each measuring about 75 × 55 cm Within each pit were noted ash, charcoal and the remains of a clay stele as well as of what are known as terracotta cakes. Of the last-named item, complete examples were found in some of the 'fire-altars' in the residential houses of the Lower Town (cf. below, p.00). The clay stele, as seen from the relatively more intact examples in the Lower Town, stood vertically up, was either cyclindrical or slightly faceted, and measured about 30-40 cm in height and 10-15 cm in diameter. It would even appear that it occupied the focal position in the complex.

The row of these altars ran north-south and immediately behind it was a burnt-brick wall. The result of such a disposition of the row of the altars and the wall must have been that whosoever used the altars had to sit on their western side, facing the east. Although it may not be possible to understand the significance of such a disposition right now, the point is worth taking note of, since facing the east did become important in subsequent ritual practices in India.

To the west of the row, but within easy reach of the 'worshipper', was the lower half of a jar, partly embedded in the ground and full of ash and charcoal. Perhaps in it was kept some ready fire to be used for the ritual.

In this context, no less noteworthy is the fact that on this very platform, a short distance away from these altars, were a well and the remains of a few bath-pavements with attached drains. This kind of lay-out clearly suggests that ceremonial bathing constituted a part of the ritual, whatever its other details might have been. For the construction of the well, bath-pavements and drains, kiln-burnt bricks were used, so that the mud-brick platform on which these stood did not get slushy. The drains from the top of this platform, as also from the tops of others, discharged into the bigger drains, often covered, that ran through the streets in between the platforms. The final discharge appears to have been towards the west and south-west and not towards the east where at a distance of hardly 40 metres lay the 'Lower Town'.

To take up the nature of the remains on the top of another such platform within the southern rhomb. On it were noted not only a well and a 'fire-altar', but something more: it was a rectangular pit, measuring 1.25 × 1 m and lined with kiln-burnt bricks. Within it lay bovine bones and antlers, evidently representing some kind of a sacrifice. That the offering of animals in sacrifice 7
was a Harappan practice is also suggested by certain seals, for example the one from Mohenjodaro. It depicts a deity in front of whom kneels a devotee. Behind the latter is an animal, in all likelihood brought as an offering. (Incidentally, in the register below stand seven worshippers in a 9
row—a significant number to which reference has already been made above. p.00)

Indeed, Kalibangan itself may have something more to convey with regard to animal-sacrifice. On a triangular terracotta cake (unfortunately broken) are depicted a deity on one side and, on 8
the other, a person drawing an animal with the help of a rope (?) tied round its neck. Since the depiction is by means of incised lines which run very liberally through the body, it becomes very difficult to identify the animal. But that some animal was intended to be drawn seems to be reasonably indicated, particularly by the face and the neck. The body of the figure on the other side is also profusely cross-hatched, but that it was meant to be a deity is clearly suggested by the headgear, comprising two horns and a central feathered crest, which is on the lines of what one

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

10 sees on the head of the 'Śiva-paśupati' figure on the well-known Mohenjo-daro seal.

Thus, at least two kinds of rituals seem to have been performed on these platforms: one relating to animal-sacrifice, and the other in which fire played an important role. In this context it may perhaps be made clear that the 'fire-altars' do not seem to have been associated with any kind of animal-sacrifice, since no bones were found in or around them.

From the foregoing description of what obtained atop the platforms in the southern rhomb, it becomes abundantly clear that this part was devoted to religious purposes of a public character. This point of 'public character' remains perhaps to be explained since, as already mentioned earlier, there were 'fire-altars' in the residential houses in the 'Lower Town' as well. In many of the houses, one of the rooms seems to
11 have been earmarked for putting up a 'fire-altar' which was renewed over and over again as the working level went up. But it is self-evident that in these cases the ritual was performed by the occupants of the house. In no house was found a 'row' of the kind noted on the platform in the southern rhomb, nor were there adjoining wells, bathing platforms and drains. Also, the kind of sacrificial pit noted on the top of another platform in the southern rhomb, was conspicuous by its absence in the residential area. Hence the case for public or congregational worship in the religious complex of the southern rhomb.

In this connection a few more points may be noted. Entry to the southern rhomb was had through two gates, one each on the south and the north. Both the gates were flanked by salients, but the relevant point here is that in both cases there were steps leading up to the actual point of entry through the fortification-wall. Such provision clearly precluded the entry of any vehicular traffic into the southern rhomb. And perhaps this was as it should have been, for no one would appreciate people riding about in vehicles through what may perhaps more appropriately be termed a 'Temple-complex'.

The two entrances while having the common feature of being flanked by salients and provided with steps, showed some noteworthy difference in details. Thus, while the staircase leading to the northern entrance was made of mud-bricks alone
12 and was not very wide, that on the southern side had mud-brick soling with burnt-brick veneer, was much wider and had provision for a few landings too. This difference is understandably in 13
the context of the relative use of the two entrances; viz. while the one on the northern side was used by only a limited number of people residing in the northern rhomb, that on the southern side was the real public entry, for all those coming from the 'Lower Town', as well as from the area immediately to the south of the southern rhomb itself. The burnt-brick veneer was evidently provided to meet the much greater wear and tear at this entrance.

In the context of the southern entrance, it may also be noted that on a footing to the east of the two salients flanking it, there were a few regularly spaced circular holes. While more of these holes 14
could not be identified owing to large-scale spoliation of this as well as the western salient, it would appear that these were deliberately planned: a probable use might have been to insert poles, carrying banners at the top. Such a conjecture would seem to fit in with the public religious festivities which are likely to have taken place in the southern rhomb from time to time.

On the northern side of the southern rhomb, almost alongside the exterior face of its fortification-wall, there was a sufficiently wide mud-brick-on-edge, pavement. It commenced near the 15
eastern end and, on the basis of the few rows of bricks-on-edge found along the exterior of the eastern of the two central salients, may be assumed to have run up to the flight of steps which led to the entrance into the southern rhomb from this side. One is tempted to surmise that on specified occasions, there marched, on this paved pathway, a procession of priests, perhaps led by the high priest, and walking up along the flight of steps it entered the 'temple-complex' of the southern rhomb, where the priests ascended one or separate platforms to perform or preside over the rituals. The laity by then had perhaps already gathered within the complex, entering it through the southern gate.

It has already been mentioned above that though the northern rhomb was also fortified, the fortification-wall in its case was, as it were, a supplement or extension of that surrounding the southern rhomb. (It may be recalled that the two central salients of the bipartite wall projected outwards into the northern rhomb, which gave the southern rhomb its primary status.) Within the northern rhomb there were no platforms, no con-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

gregational 'fire-altars', no sacrificial pits, but
16 only residential houses planned on either side of a street which, starting off from near the eastern of the two central salients of the bipartite wall led to a river-side exit on the north-west. In these houses there evidently dwelt the priests and others connected with the administering of the rituals in the southern rhomb. One may also reasonably infer that in a priest-dominated society, such as the Indus one seems to have been, the civic administration also may have been handled, partly, largely or even wholly, by these very priests. However, how priesthood was handed down and how the head priest, if any, was appointed will remain matters for guess work, at least until the seals begin to speak; or may be these too remain silent on this particular point.

In view of the foregoing, would it not be desirable to re-think about calling the western wing of the settlement the 'Citadel'—a term which usually implies a fortified seat of the king or chieftain in a purely political sense? To continue to regard it as the 'Citadel' would be to continue asoribing to the Indus Civilization a polity which the evidence does not seem to warrant. And it is this concept of the 'Citadel' which has been magnified into regarding it a 'well protected government headquarters either central or provincial'. Indeed, letting the imagination run further, scholars have even gone to the extent of visualizing hungry marchers scaling the walls of the Citadel.

There would have been some justification in making an assumption of the kind Mate has made (above, p.00), had the rest of the settlement been in the form of hovels and shanties. But this is hardly the case. The so-called 'Lower Town' may have been lower in the sense that the buildings in it did not stand on platforms, but there is nothing to indicate that in it there lived the 'have-nots' whereas the 'Citadel' housed the 'haves'. And, as seen earlier, even in the so-called 'Citadel', the platforms were erected only in the southern rhomb, as podiums for carrying superstructures of religious denominations; the buildings in the northern rhomb, which were of a residential kind and in which most probably lived the priests and others directly concerned with the affairs of the southern rhomb, did *not* stand on platforms. In fact, there is nothing to show, at least on the basis of the evidence obtained so far, that the houses in the northern rhomb were in any way superior to those in the 'Lower Town'.

And what is more important to note in this context is the fact that even the 'Lower Town' *had* a fortification-wall around it and that the wall was laid out right at the beginning of the Harappan settlement. It means that 'fortifying' both the 'Citadel' as well as the 'Lower Town' was an integral part of the *initial* concept in so far as the planning of the Harappan township at Kalibangan was concerned. In fact, evidence is piling up to show that Kalibangan was not the only site where the 'township' was enclosed by a fortification-wall. For example, the habitation areas at Lothal (Rao 1973) and Surkotda (Joshi 1972) in Gujarat and at Banawali (Bisht 1978) in Haryana have also been found to be fortified.

The southern edge of the 'Lower Town' at Kalibangan had largely been eroded, with the result that no traces of the fortification-wall were met with on this side. But the wall was duly identified on the other three sides, viz. western, northern and eastern, although in the last-named case only the central part was found to have survived.

Two gateways of the fortifications were recorded. One of these was located about the middle of the western side and may have served 17
as the principal communication channel with the 'Citadel'-complex. The other one was on the north-west and, like its counterpart in the north- 18
ern rhomb of the 'Citadel', provided access to the river-front. The river, then full of water, must have witnessed boats plying up and down, bringing in surplus foodgrains from the neighbouring villages and carrying back manufactured commodities from Kalibangan. This gate was duly flanked with bastions.

It is likely that there were two more gates of the 'Lower Town', probably placed symmetrically opposite the two identified ones, but since the parts of the fortifications at the concerned points have been eroded, it is difficult to affirm the hypothesis. If these gates did exist, the one about the middle of the eastern side may have provided access to the small ritualistic complex (KLB-3 on plan) on the east to which a detailed reference will be made shortly.

The 'Lower Town' measured about 240 m from west to east. Since the southern part has been considerably eroded, it is difficult to be exact about the north-south spread: but it is un-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

likely to have been less than 360 m—the present available stretch of the mound. The township, like its counterpart at Mohenjo-daro, had a roughly north-south and east-west orientation of the streets. Since the eastern and western fortification walls were oriented very nearly north-south and the streets deviated slightly westwards, triangular habitation-blocks were the result on the western and eastern sides. However, for all practical considerations, the planning may have been conceived on the grid-pattern. In the north-south direction there were four arterial streets, plus a short-distanced one in the south-western part. It is likely that corresponding to the last-mentioned street, there was another in the north-eastern part, though it was not duly excavated. There was evidence of four east-west cross-streets, including lanes.

About these lanes and streets there are two interesting points to be noted. First, their width increased in the set ratio of 1:2:3:4, the corres-
19 ponding measurements being approximately 1.8
20 m, 3.6 m, 5.4 m and 7.2 m which speaks very highly of the sense of proportion that the Kalibangan town-planners had. Second, at the street-crossings, wooden fender posts were provided to prevent the house-corners from being damaged by vehicular traffic. At least at two corners the remains of these posts were duly identified and in one case, it was further noted that a new one was
21 put up again as the road-level rose. There was, however, no evidence of road-metalling except in the late levels when overburnt terracotta nodules were rammed to provide a hard surface.

All through the history of the site there was no
19 encroachment on the streets, although eight to ten structural sub-periods were noticed, accounting for an accumulation of about 10 metres. However, one did find on the sides of the streets, jars embedded in the ground to receive sullage
22 water drained out from the houses. Since there were no street-drains to carry the water outside the township, the question arises as to who cleaned these sullage-jars. At the moment no clear-cut answer can be given, although it may not be far off the mark to visualize a category of workers doing this kind of job. In these streets were also noticed narrow mud-brick platforms abutting the exterior walls of the houses. Judging from the use of similar platforms *(Chabutaras)* in the villages of the area today, it would appear that, after the day's hard work, the Kalibanganites gathered on them for an evening gossip or even occasional serious discussions.

By means of the cross-streets and lanes, the township was divided into blocks, and each block contained a group of houses in such a way that each house had an opening on one of the streets. These entrances were sufficiently wide and seem to have been kept so in order to freely admit bullock-carts and cattle into the courtyard. Although no doubt no remains of bullock-carts were found in the excavation, one may reasonably infer their use on the basis of their terracotta models. That the cattle were kept in the courtyard is suggested by the presence therein of mud-brick troughs and jars embedded in the ground: from 23
their present-day parallels it may be inferred that the troughs were used for feeding cattle and the pitchers for keeping drinking water for them. Often in the courtyard there was a well and in a sheltered corner a hearth, the latter reminding one of the cooking habits of the people in that area even now. On three sides of the courtyard there were rooms, sometimes their number even reaching a dozen. These were meant for living, storage etc., and, as already stated earlier, one of 25
them appears to have been earmarked as a *puja-ghara* (worship-room). The living rooms were often paved with mud-bricks and in one case a tiled floor was also observed. In the late levels a 26
very interesting feature was noticed in regard to the flooring. Below the clay floor there lay a layer of terracotta nodules interspered with charcoal. Enquiries made from local engineers reveal that this kind of soling, particularly the intermixing in it of the charcoal, prevents ground moisture from travelling up along the walls and thus saves them from salt-action. Secondly, it also acts as a deterrent to termites. Would'nt one like to give marks to the Kalibanganites for their ingenuity in this regard?

The foregoing description of the nature of the houses in the 'Lower Town' leaves no room for any assumption that their inhabitants were the 'have-nots'. They were indeed prosperous peasants enjoying all the amenities of the day. An 27
agricultural field with criss-cross furrow-marks found associated with the pre-Harappan levels at Kalibangan, shows that even from that early time, 28
people had taken steps to augment production by 29
growing two kinds of crops simultaneously in the same field (Lal 1971). Besides agriculture, various craftsmanships, trade and commerce were

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

their other occupations, as clearly evidenced by the kinds of finds from these houses—metallic objects, seals, weights, etc. Here then one can envisage an essentially agricultural-*cum*-trading community inhabiting the 'Lower Town'. Indeed, one may reasonably argue that it is these people who may have contributed financially towards the upkeep of the temple-complex in the southern rhomb of the so-called 'Citadel', as also towards the support of the priestly class residing in the northern adjunct. From the general set-up it would further appear that this contribution was made in a spirit of corporate life rather than because of forced extraction by a politically superior being—a king.

Indeed, the absence of any building which may be regarded as a 'palace' goes counter to the idea of Kalibangan having been ruled by a king. Furthermore, the evidence even in death was no different from that in life: for, though there were typological variations in the graves excavated at Kalibangan—e.g. while some were rectangular
33 on plan and contained the human skeleton some others were circular and bereft of skeletal
32 remains—there weren't any graves which could be regarded as those of kings, even on standards far below those of the Pharaohs.

There remain two parts of the settlement at Kalibangan which ought to be referred to now, viz. (i) the mound marked as KLB-3; and (ii) the unmarked but contoured and well-defined area to the south of the 'Citadel'.

KLB-3 is a small low mound, considerably eroded. The excavation over here revealed four
31 to five 'fire-altars' located inside a large room. These, however, were not in a row but located individually. In addition, the remains of a thick outer wall were also observed. May be it was an overall enclosure-wall. A question naturally comes to mind: why another 'fire-altar' complex, when there was already one in the so-called 'Citadel'? The answer might lie either in temporal stratification or even in social stratification. Thus, it is probable that this complex came into being at a time when the one in the 'Citadel' was on the wane: in fact, a wall of a house located to the
30 south of the 'Citadel' was found overriding the eroded edge of one of the salients which clearly shows that the 'Citadel'-complex had gone into disuse within the lifetime of the Harappans themselves. That there could have been a division in the use of the two 'fire-altar' complexes on the basis of social stratification cannot also be altogether ruled out since, as would be seen from what follows, there did exist some kind of classification in the Harappan society.

In the area to the south of the 'Citadel' no regular excavation was carried out. But a search for the continuation of the alignment of the fortification-wall of the 'Citadel' gave a negative answer. In other words, unlike the 'Citadel' or the 'Lower Town', this area was unfortified. The surface finds revealed that those who inhabited this area were Harappans all right; outlines of some of the houses were also noted. In an exposure near the southern end, there lay large quantities of Harappan pottery. It is thus likely, though not proved, that in this unfortified area there lived the potters and other workmen who tended to the needs of those who occupied the northern rhomb of the 'Citadel' and of even those residing in the 'Lower Town'. Such an assumption gains support when one recalls the disposition of the workmen's quarters to the north of the Citadel at Harappa (Vats 1940).

It would then appear that the Harappan society was not a classless one. Those who lived in the northern part of the 'Citadel' and looked after the religious ceremonies in the southern belonged evidently to a priestly class. Next in social hierarchy were perhaps the agriculturist-*cum*-traders who lived in the 'Lower Town' and constituted the bulk of the population. Finally, there was the working class which, though not living below the poverty-line was certainly underprivileged for it was the only section of the society which was left 'unfortified'.

REFERENCES

Bisht, R.S. 1978. Banawali: A new Harappan site in Haryana. *Man and Environment*. Vol. II; 86-88.

Fairservis, Walter A. 1975. *The Roots of Ancient India* (2nd ed.). Chicago.

Joshi, J.P. 1972. Exploration in Kutch and Excavation at Surkotada and New Light on Harappan Migration. *Jour. Oriental Institute*. Vol. 22; 98-144.

Lal, B.B. 1971. Perhaps the Earliest Ploughed Field so far Excavated anywhere in the World. *Puratattva*. No.4; 1-3.

———. 1979. Kalibangan and the Indus Civilization. In *Essays in Indian Protohistory*: D.P. Agarwal and Dilip K. Chakrabarti eds. Delhi.

Lal, B.B. and Thapar, B.K. 1967. Excavations at Kalibangan: New Light on the Indus Civilization. *Cultural Forum*. July 1967; 78-88.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro.* Delhi.

Marshall, John. 1931. *Mohenjo-daro and the Indus Civilization.* London.

Mate, M.S. 1970. Harappan Fortifications—A Study. In *Studies in Indian Archaeology;* S.B. Deo and M.K. Dhavalikar eds. Bombay.

Rao, S.R. 1973. *Lothal and the Indus Civilization.* Bombay.

Thapar, B.K. 1975. Kalibangan: A Harappan Metropolis Beyond the Indus Valley. *Expedition.* Vol. 17, 2; 19-32.

Vats, M.S. 1940. *Excavations at Harappa.* Delhi.

Wheeler, R.E.M. 1947. Harappa 1946: The Defences and Cemetery 'R 37'. *Ancient India.* No.3; 58-130.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

7

Arun Kesarwani

Harappan Gateways: A Functional Reassessment

It is common knowledge that most large Harappan towns were encompassed by elaborately designed walls with gateways but opinions are sharply divided on the function of these walls. According to one view, chiefly propounded by Mortimer Wheeler, and recently reiterated by J.P. Joshi, these were meant to be defence walls against enemy inroads. According to another view, the chief protagonist being S.R. Rao, supported by George Dales and some others, it was a protective wall against floods. However, most arguments centred round the constructional details of these surrounding walls and enough attention was not paid to the gateways of these 'fortifications'. To our mind, a true assessment of the gateway alone shall provide the correct answer; for it is the most vital aspect of the 'fortification'. Therefore, the Harappan gateways have been critically examined in this paper.

Our findings show that the Harappan fortification had hardly any military function to perform. At the same time, they were not merely a protective embankment against floods. That they also had a very vital social function to perform, is our contention.

To begin with, the most important town is Harappa, where on the fortified citadel area, three gateways, termed A, B, C, **(fig. 7.1)** and a re-entrant in the northern wall **(fig. 7.2)** have been located by Wheeler (1947:62-83; 1960:57). Among these gateways, B and C were complex, but A, and another gateway in the northern wall, were comparatively simple. Incidentally, these gateway-complexes were built, rebuilt, modified and blocked during three successive periods I, II and III.

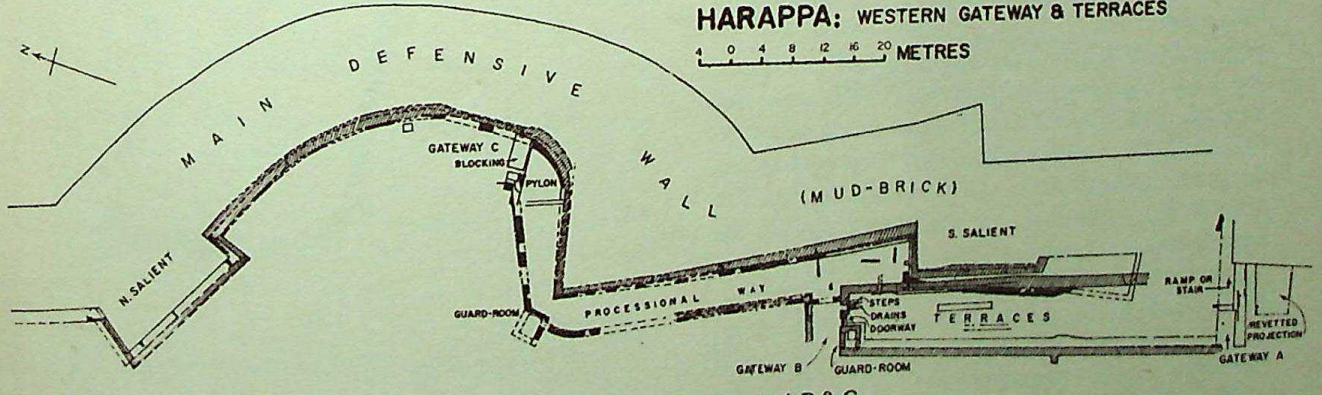


Fig.7.1. Harappa: Gateways A B & C

Entrance A is located at a point where the mud-brick structures were interrupted by a rising

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

passage between lateral walls of mixed mud-brick and baked-brick. It was a simple one, consisting of a narrow passage, about 2.4 m in width, which leads to a ramp or stairs. Access to this entrance was directly from outside as no terrace was built during Period IA. But in periods IB and IC, a terrace 1.2 m in height, was built at a distance of about 8.5 m from the main wall. It rises to a height of 2.4 m and is continued by a ramp or staircase to the gateway near Entrance A (Wheeler 1947:71).

34 Entrance B, facing west, though simple is yet comparatively, more complex than Entrance A. In Period I, it consisted of featureless parallel walls found incomplete at the outer end. In Period II it was rebuilt on the same plan. A burnt layer and a few burnt-bricks were found at Entrance B, which, significantly enough, does not prove its violent destruction (Wheeler 1947:71).

35 Here, however, a development is seen: two niches or wall-seats were added in the northern wall in the neighbouring passage from Entrance C. This entrance was supported by a guard-room of which the door-sockets and part of the worn sill of bricks set on edge are the only remanants. Immediately south of Entrance B, a flight of steps was added, of which two treads still survive. In Period III, Entrance B was partially blocked by a screen wall with reduced room in the middle.

Entrance C, on the western fortification wall, happens to be the most complex one at Harappa (Wheeler 1947:71-74; Thapar 1976:4). In Period I the eastern side of Entrance C is formed

36 by a curving revetment **(fig. 7.1)** of the main defensive wall. The western part of this gateway is formed by a massive pylon with an astonishingly long entrance passage. This passage follows the line of the main wall, turning with it sharply towards the south and ultimately joining the passage from Entrance B. This gateway is also supported by a guard-room, projected at an angle. On the location of these ceremonial terraces and processional way, Piggott's (1950:164) remarks are highly significant: 'These were all situated in a curious curved re-entrant of the defensive wall, not explained by the normal need of defence.' Wheeler (1947:73) rightly postulates the presence of an important building near this gate and re-entrant. He further thinks, that the re-entrant constituted an assembly area, to which the long passage from Entrance C formed a ceremonial approach. Piggott (1950:161 and 164) concludes, 'the plan was designed to conform with the needs of some sort of ceremony, religious or secular or both in which the terrace or terraces played a dominant role and to which processional access was required.' In Period III, this entrance was completely blocked by a barrier of baked and unbaked bricks. Presumably, the social gatherings for which it was once considered functional were no more organized here.

The northern gateway **(fig. 7.2)** with a wide passage located in the northern fortification wall, was just a simple entrance. It had direct entry without any extra support. No guard-room has been noticed here. Because of the vestiges of the mud-brick defensive wall, which turns inwards to

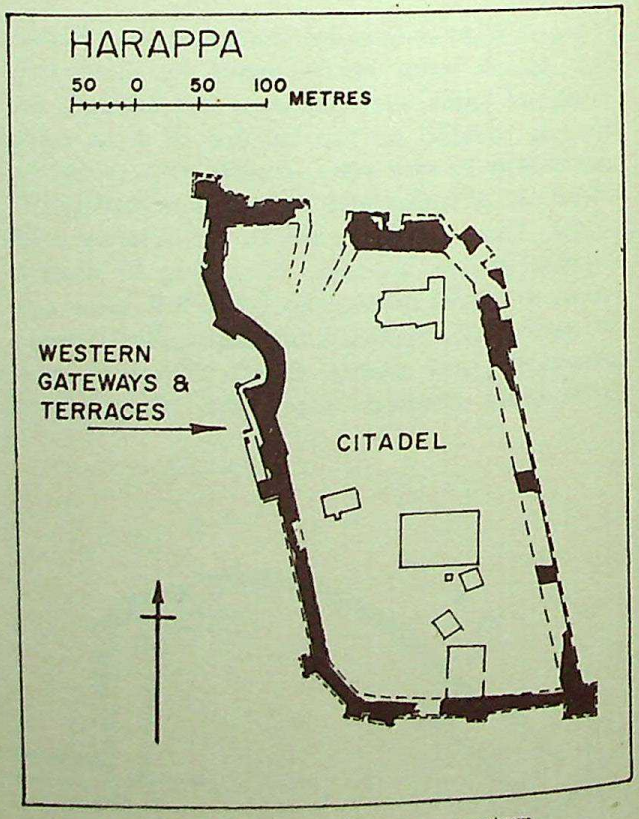


Fig.7.2. Harappa: Gateways, western

a marked extent. Wheeler (1947:70) thinks that it might have flanked a long ramp or staircase. It is presumed, that this gateway or the re-entrant on the north was the main entrance to the 'citadel' of Harappa. But surprisingly enough, it looks like a gap in the fortification, almost like the one we have in the pre-Harappan fortification at Kalibangan (Wheeler 1947:64; Piggott 1950: 161; Thapar 1976:4).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

While describing the gateway of Harappa, Wheeler (1947:11) has remarked, rather apologetically, 'It is both complex and remarkable, and in the absence of better preserved analogies, may for the present be recorded rather than explained.' What is significant for the present study is, however, that the gateways A, B and C were not meant for any military purpose, since they are not located within the structural remains of the defences. If anything, they were used for religious or social gatherings. The real gateway to the city located within the structural remains of the fortifications, was the northern one, never excavated, but just a simple entrance.

39A *38B* The next major Harappan town is Mohenjo-daro. Here, Wheeler (1947:71) and Dales (1965:17-19; 1979:15), feel that the citadel and the lower city were fortified but no clear plan of the gateways has so far been found. Wheeler (1960:30) as also Thapar (1976:3) have observed that two of the rectangular bastions of the south-eastern corner seem originally to have flanked a postern gate, which was subsequently blocked and replaced by a platform with a parapet. To the west of the citadel and to the north of the baked-brick tower, a small postern has been identified. Wheeler (1947:64) feels that:

> In the northern end of the mound there is evidence, as at Harappa, of a marked re-entrant which presumably indicates the position of the main entrance: whilst towards the southern end of the western side a semi-circular 'bite' is significant like the re-entrant on the west side of Harappa.

After the excavation of a part of the HR area in the lower city, Dales (1956:17) concluded that at least one part, if not the whole, of the western side of the lower city had a massive burnt-brick wall to protect it, presumably, from floods. He subscribes to Raikes' theory that, in order to save the city from repeated floods, successive cities were raised on freshly laid high platforms and that this HR area wall, about '25 ft high 6 ft thick' running 'for a distance of over three hundred metres along the base of the mound', may have served as the facing wall of one of these platforms. But no remains of the gateways, if they were there, have been found so far.

About this site Mackay (1938:25, 32, 151) once observed that 'by central street one can reach the heart of the city from the western gate,' and also, 'this (central street) seems to have been the chief entrance into the city through a north-west gate'. There was an eastern gate also. But these were all open gateways without any elaboration. These were, however, according to Mackay, commanded by watch towers (Mackay 1938:148). But what did they look like? He has not told us. Wheeler (1950) has, of course, excavated a so-called bastion along the 'fortification'. This may have only been a constructional elaboration of the defences against floods since Raikes and Dales have shown, more or less convincingly, that the fortifications here were, in fact, protective bunds of the platforms we have just described.

Another important town is Kalibangan, in the Ganganagar district of Rajasthan (Lal 1962:454-457; *IAR 1963-64:* 30-39; Thapar 1973:85-104; 1975:19-32). Here, not only Harappan, but also pre-Harappan, settlements were found fortified (Thapar 1975:20-23; 1976:5-8). The single gateway that has been found in the pre-Harappan 'fortification' in the northern wall towards the north-west is just a gap-like passage which had direct and easy entry from the outside (**fig. 7.3**).

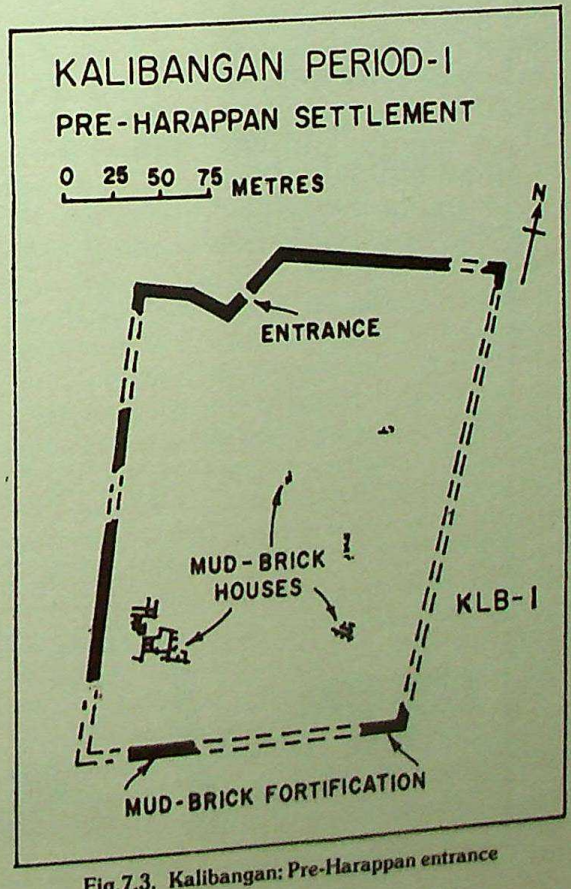


Fig.7.3. Kalibangan: Pre-Harappan entrance

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

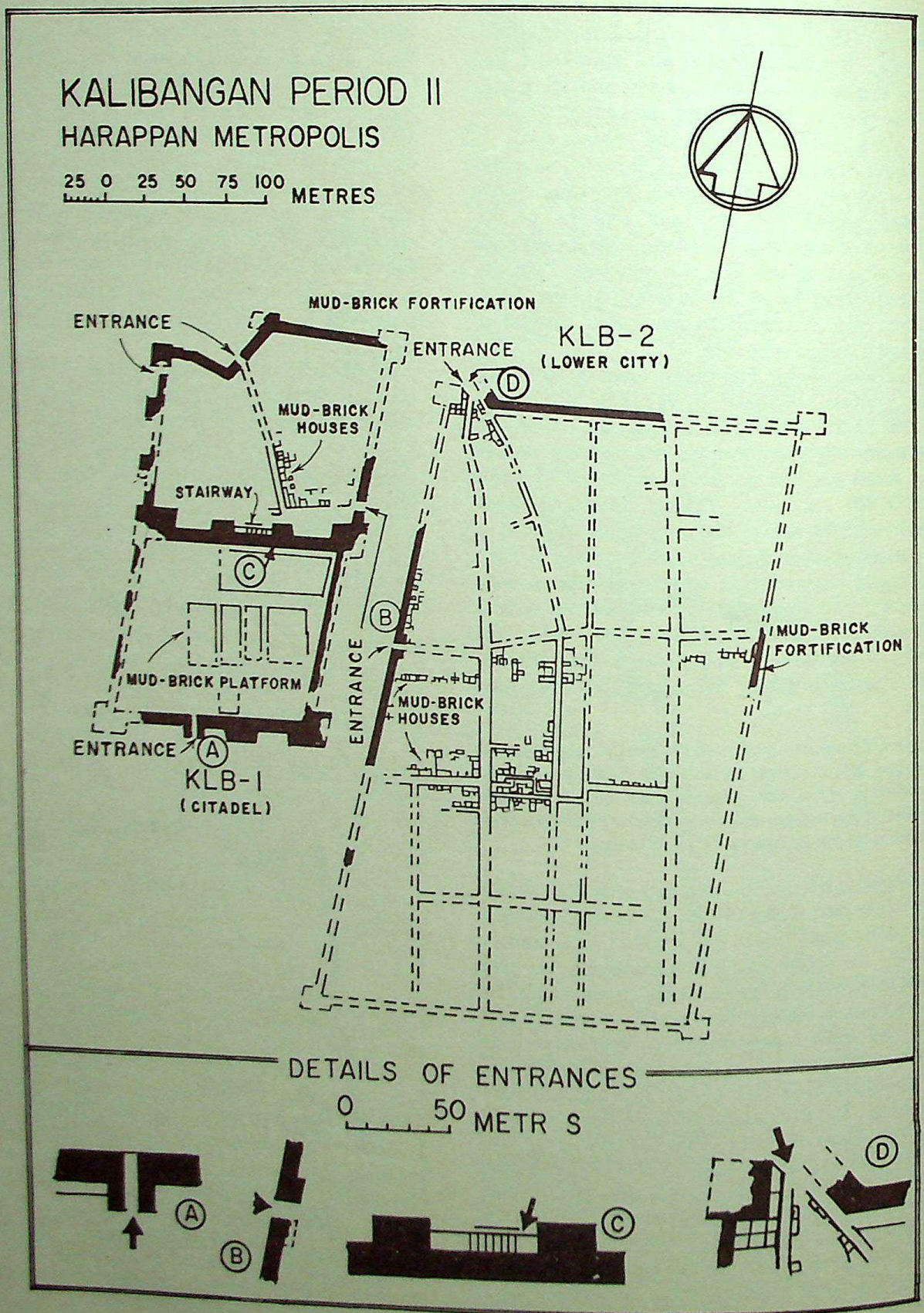


Fig.7.4. Kalibangan: Harappan entrances

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

The gateway was, however, developed during the Harappan period, when not only the 'citadel' but also the 'lower town' was fortified (Thapar 1975:23 ff; Lal 1977). It is significant that the 'citadel' area was divided into two almost equal parts by a partition-wall, running east-west. Three gateways (one each on the northern, western and eastern side) were exposed in the northern half of the 'citadel'. They were controlled by a 'bastion'. It seems that the northern gateway was rebuilt exactly on the same plan and at the same place where it was located in the pre-Harappan period, except for the addition of two salients on both sides of the gateway. It is observed:

> The wall (northern wall) was found to run parallel to the partition-wall up to a length of 85 metres from the eastern and thereafter showed a re-entrant angle within which was located an unpretentious entrance. At the turning, this re-entrant was further marked by a salient which projected nearly 6 metres from the main wall. (*IAR 1966-67*:31).

This gateway seems to be an important one as a street, running north-south, obliquely leading to this gateway, has been traced. The eastern and western gateways were simple openings in the 'fortifiction' wall, with a wide passage **(fig. 7.4);** only the eastern gateway was paved with brick-on-edge. No guard-room or control tower or staircase or ramp has been found attached to any of these gateways.

In the southern half of the citadel, two gateways have been located; one on the south and the other on the north. For construction of the southern gateway (of baked bricks) and the salient, the pre-Harappan fortification wall was cut for laying the foundations (*IAR 1965-66*:40). This gateway was, located between two corner-towers and a salient on the eastern side. It had a 2.65 metre broad passage. In the absence of well-preserved structures, Lal (1977:11) and Thapar (1975:25) have rightly pointed out that this gateway might have been stepped, fronting the main fortification wall. This gateway was, however, not so important as no guard-rooms or control towers have been found here. It may have been used for casual communication with the lower city as is clear from its location. The northern gateway, in the southern half of the 'citadel', is situated between the two central salients. The approach for this gateway was from the north through a broad stairway which, running along the outer face of the fortification wall between the two centrally located salients, led up to the required height, where a passage across the fortification wall was provided (Thapar 1975:25; Thapar 1973:96). Lal (1977:10) has mentioned that, close to this passage, there was a broad and fairly long pathway paved with mud-bricks along the northern side of the bipartite wall. He adds, 'it may have been a ceremonial pathway along which a priestly procession marched into the southern half to perform rituals.' According to Thapar (1973:97; 1975:25; *IAR 1965-66*:39) this entrance was used exclusively by the dwellers in the residential area (northern half) of the citadel.

In this entrance-complex, two structural phases were recognized. In the first phase, there were steps, built with mud-bricks (40 × 20 × 10 cm), and replaced in the second by a ramp screened by a 1.5 metre wide mud-brick (30 × 15 × 7.5 cm) wall. Of significance is the observation of the excavators on its function: a simple processional pathway for socio-religious functions. In other words, they did not believe that the gateway had any military purpose to serve.

In the lower city, which was also surrounded by a wall, two gateways have been found, one on the north and the other on the west. The latter was flankd by a simple guard-room. It had a passage about 5 metres broad. The street (third from south), running east-west, converges on this gateway. The northern gateway was located in the northern wall, towards the extreme west. Two streets obliquely running in the north-south direction, lead to this gateway. The remaining two streets, run north-south, and about 5 metres in front of the well where a passage was provided along the wall to the northern gateway. No guard-rooms could be located in this part of the entrance. Thapar, the excavator, (1975:27; 1973:98) feels that the northern gateway was used for the city's commercial traffic, and the western gateway was used for communicating with the 'citadel'.

It is, therefore, clear that the simple design of the citadel and the lower-town gateways of Kalibangan had no strategic importance. They were ordinary entrances for the free movement of people and goods.

Surkotada is also one of the most important Harappan settlements where surrounding walls with gateways **(fig. 7.5)** have been found (Joshi 1966:64; Joshi 1972:98-144). The characteristic feature of the Surkotada fortification is, that not

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

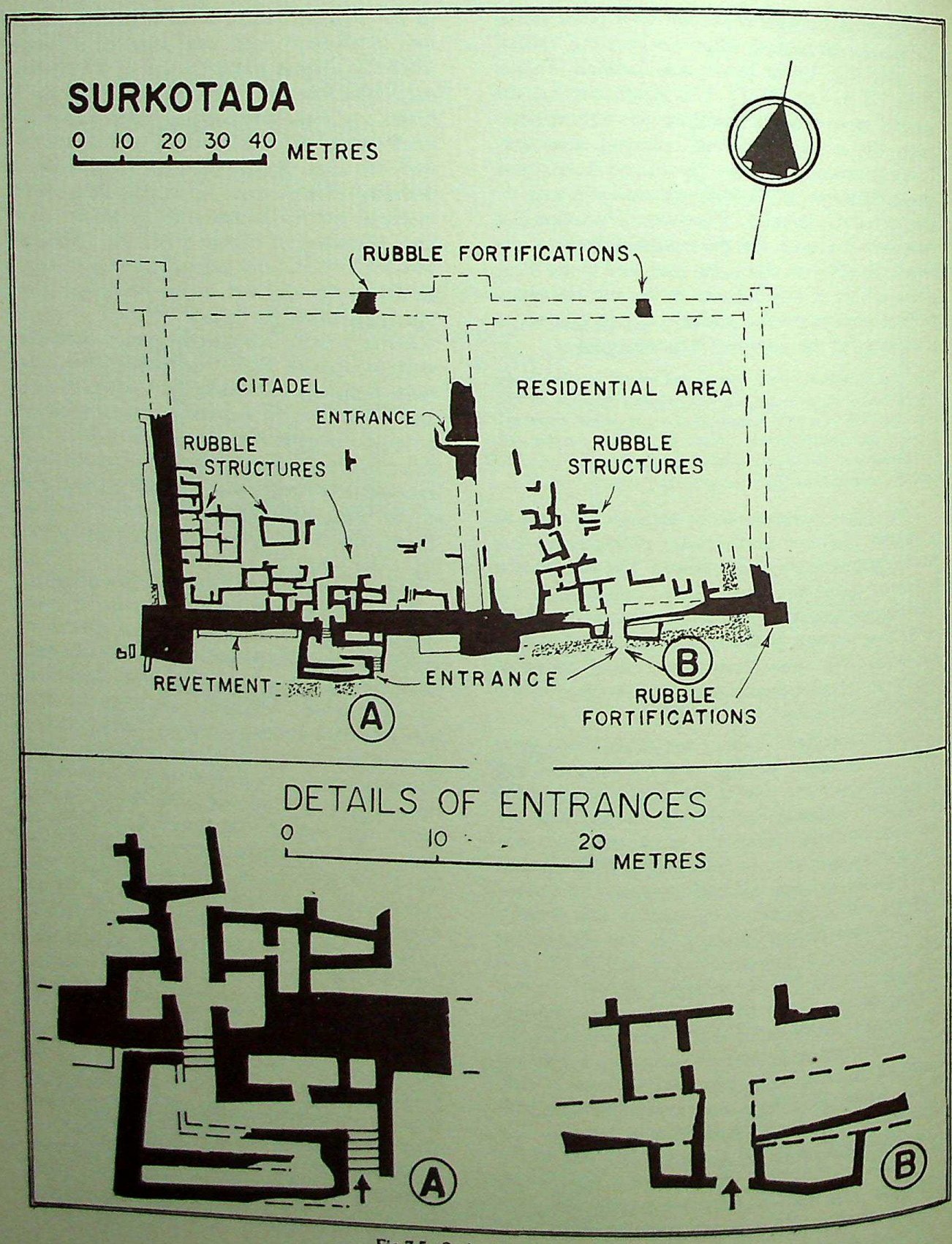


Fig.7.5. Surkotada: Entrances

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

only mud and mud-bricks (40 × 20 × 10 cm), but rubble was also used for its construction (*IAR* 1970-71:13; *IAR 1971-72*). The township was a single unit but divided into two equal parts: the 'citadel' and the residential area **(fig. 7.6).** The combining or juxtaposing of the 'citadel' and the 'lower town' was a peculiar feature of western India (Lal 1977:8) although at Banawali too, in Haryana (Bisht and Asthana 1979), a similar situation exists.

plex, where a ramp running east-west and then turning north led to the citadel. It had a 1.7 metre broad passage. On the fortification wall, two guard-rooms, one on either side, were erected. A thick walled rubble structure, divided into two parts by a partition wall, was built near the right-hand side of the gateway passage (or inside the gateway-complex). On the eastern side of the citadel, an entrance with a 1.7 metre wide passage was also built in the north-south running

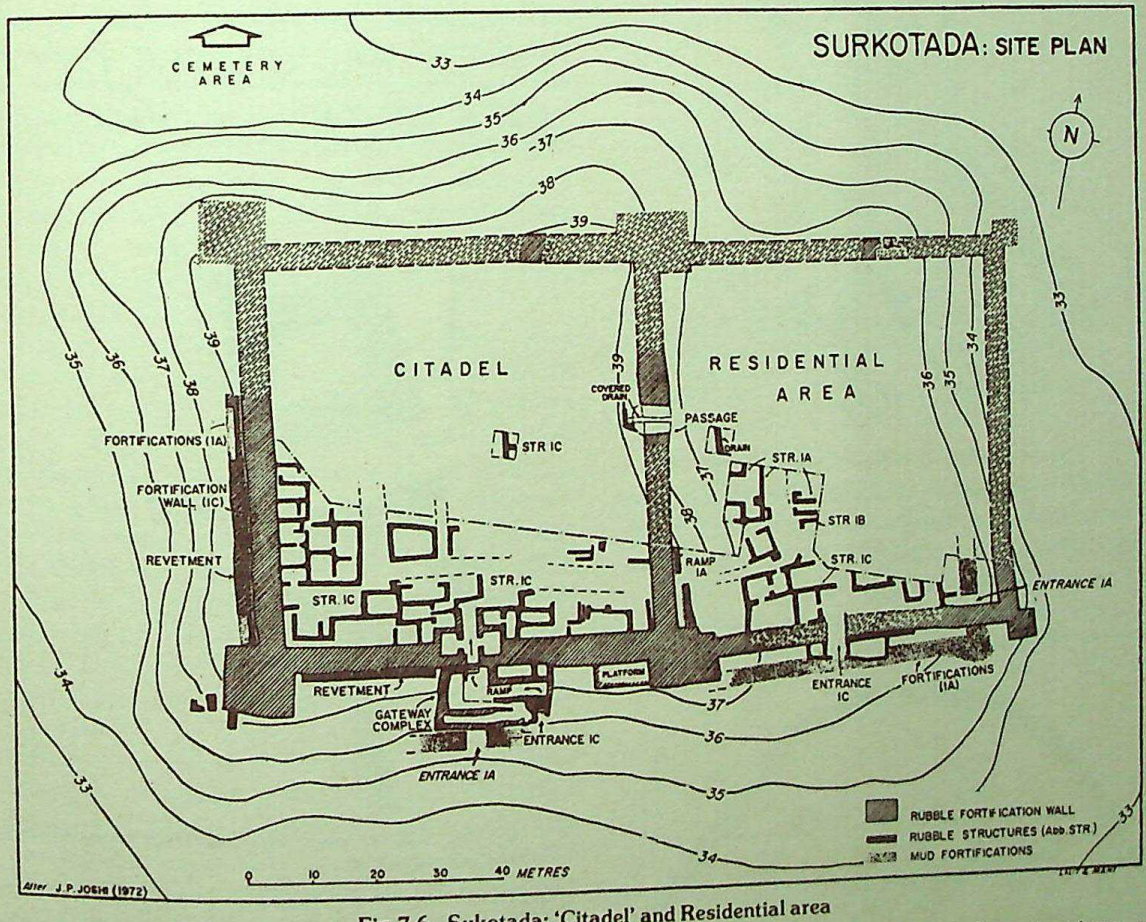


Fig.7.6. Sukotada: 'Citadel' and Residential area

Two gateways of mud and mud-bricks were built in the earliest phase IA. One is located on the south-western side of the eastern fortification wall, and the other on the southern side of the citadel area, fronting the gateway-complex of Phase IC. Traces of its remains can still be seen (Joshi 1972:122).

During phase IC, the gateways of the citadel and residential area were rebuilt in stone. On the southern fortification wall of the citadel, a gateway complex with a 10 × 23 metre projection was built (*IAR 1971-72*:18). A stairway was provided on the eastern side of the gateway complex. A semi-circular structure was provided on the citadel side of this passage. According to Joshi, this entrance was used for communication with the residential annexe. Later on, this passage was partially blocked and a covered drain was provided over it on the southern side (Joshi 1972:131).

The residential area (lower city) at Surkotada, had its own gateway-complex on the southern fortification wall. It consists of a wide passage, and two rectangular rubble structures, probably guard-rooms, built on both sides of the passage (Joshi 1972:133).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

These details make it clear that, at Surkotada, although some of the gateways were flanked by two small guard-rooms, they were neither strong enough, nor elaborate enough, to serve the needs of armed defence.

MIDDLE BRONZE GATEWAY AND LATE BRONZE TEMPLE AT SHECHEM

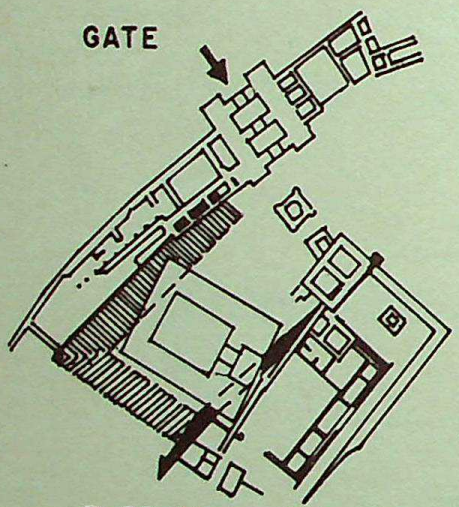


Fig.7.7. Schechem: Elaborate gateways

Lothal, yet another important Harappan town in Saurashtra, was surrounded by a thick, mud-brick wall on three sides, southern, western and northern. On the eastern side is located a dockyard and wharf (loading platform). Rao (1973:179-180) holds that this mud-brick enclosure-wall was built exclusively for the protection of the town from floods. No well-built gateway has been located, so far, on any side of the 'fortification'. A simple oblique opening in the southern wall was provided, apparently for hinterland trade and communication (the exact nature of the latter will, of course, remain unknown till the seals have been deciphered).

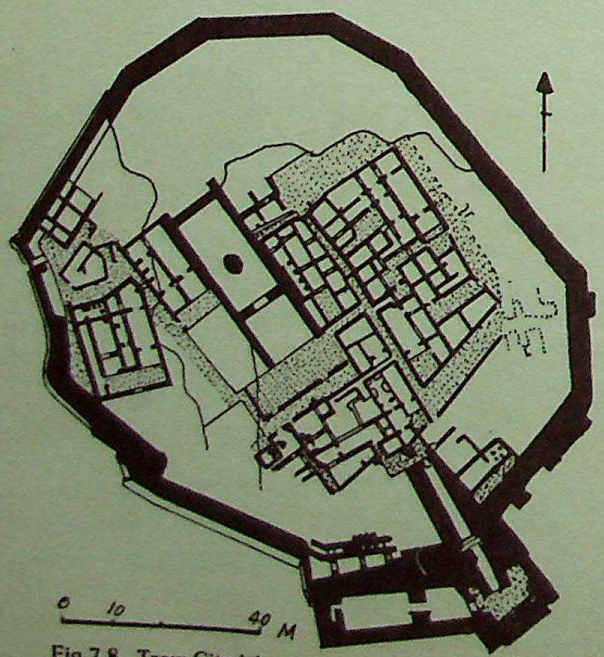


Fig.7.8. Troy: Citadel gateway, second city (2500 B.C.)

Desalpur, (*IAR 1955-56*:70 and *IAR 1963-64*:16-20; Joshi 1966:63; Soundara Rajan 1977:33-38), in the district of Kutch, is also a

EARLY BRONZE AGE CITY GATE AT TELL eL FARAH (N)

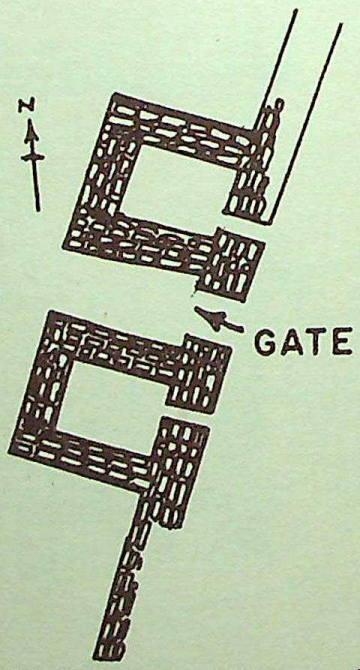


Fig.7.9. Tell el Farah (N): Gateway with guard-rooms, Early Bronze Age.

town in Gujarat. It has two units, the citadel and the residential area, juxtaposed in the same fashion as at Surkotada. Dasalpur has a stone fortification, in which the gateway, again just a simple entrance, seems to be either on the eastern side between two symmetrical rectangular bastions, where a well-laid door-sill arrangement was noticed (Soundara Rajan 1977:34), or on the southern side, now completely removed.

Sutkagen-dor, a well known Harappan town, is in the extreme north-west, near the Iranian border, on the Makran coast. Dales (1962a:3 ff; 1962b:89) excavated this site in 1962, and found that the city was divided into two parts, the lower city and the citadel area. The citadel was

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

fortified by a dressed-stone wall with a gateway. Piggott (1950:173), on the basis of surface indications observed that the gateway was located on the southern wall, at the western corner, with a 2.4 m wide passage and flanked by massive rectangular towers or guard-houses. According to Thapar (1976:5), the principal entrance to the citadel lay in the south-western corner where it seems to have been guarded by towers. This is then a far more elaborate 'fortification' than anyone considered so far. But then, in our view, this site should be considered a special case since it was located on the border of a different culture-area and was also the last outpost of the Harappans. It means that here the trade-items were to be guarded more closely than at any other place in the hinterland. It may have been an anti-piracy measure. Unfortunately, the site has as yet not been fully excavated and our knowledge of the gateways is very limited.

There are some other Harappan sites, other than those mentioned above, but of lesser importance from the point of view of the present study. At some sites, remains of gateways and fortifications, and at others, only fortifications have been traced. In this category, Banawali, Kot-Diji, Amri, Sotka-Koh, Tharo-hill, Dhillanji-kot, Kohtras Buthi, Said Qala, etc., are noteworthy. It is not possible to analyse the remains of gateways at these sites for want of proper excavation-reports. But, whatever is known, strengthens our view that these were simple entrances.

Basing on this short survey of the Harappan gateways, it can be inferred that the Harappans did not pay much importance to the city entrances, though the practice of erecting fortifications and gateways existed even in pre-Harappan times, as is clear from the evidence of Kot Diji and Kalibangan. On the other hand, in contemporary West Asia (Albright 1949:87-91), elaborately designed gateways against all kinds of expected military attacks, were built in the fortification wall running around the citadel **(figs. 7.7, 8, 9)**. Gateways in the massive Ziggurat temple walls, were also well guarded (Baumenn 1969:43-44), although there was a little difference in their use and purpose.

In West Asia, the entire planning of the fortification and the gateways had a single purpose: to keep away intruders and enemies. Here there is one more point to be noted. In Sumer there is a

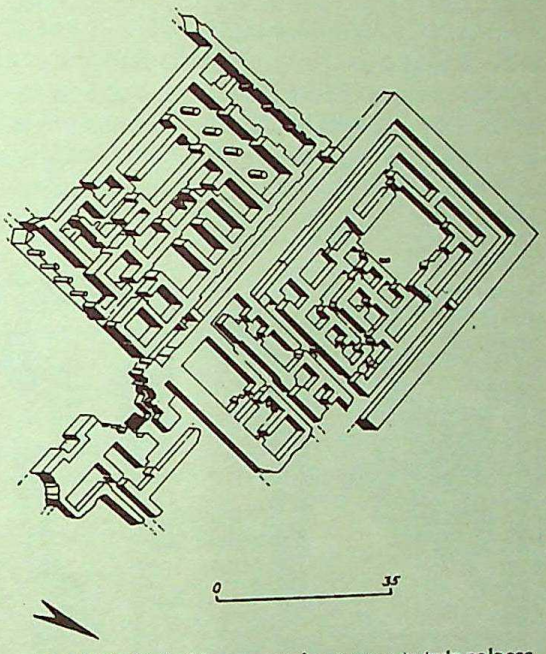


Fig.7.10 Kish: Monumental gateways to twin palaces, Early Dynastic III A period

multiplicity of urban centres situated at strategic points along a network of irrigation canals. On the other hand, in the Indus Valley as in Egypt, there were comparatively very few urban centres and a great many villages. Secondly, Sumer's history is marked by fierce rivalry between cities, all of which were subject to constant military invasions. On the other hand, the Indus Valley remained in comparative isolation (Fairservis 1971:220). Mate (1970) has rightly pointed out

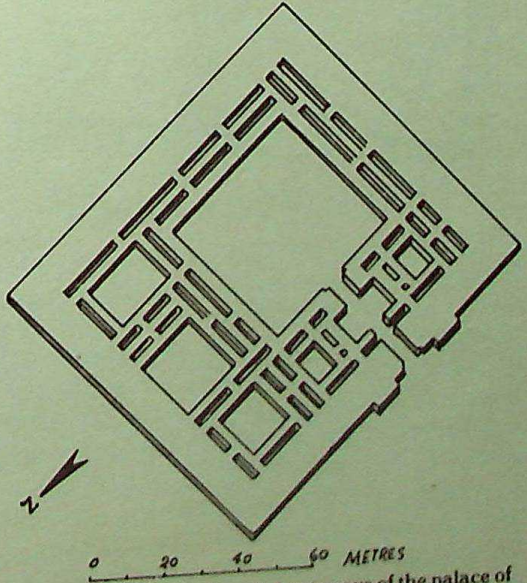


Fig.7.11 Tel Brak: Guarded gateways of the palace of Naram Sin (2201-2255 B.C.)

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

that both in contemporary Egypt and Sumer, these fortifications were a mobile instrument of offence; they were built for internal or local security, and they served as effective springboards for launching fresh aggressions. We have detailed in **(fig. 7.7-12)** some West Asian fortifications and their gateways to bring home this point clearly and convincingly.

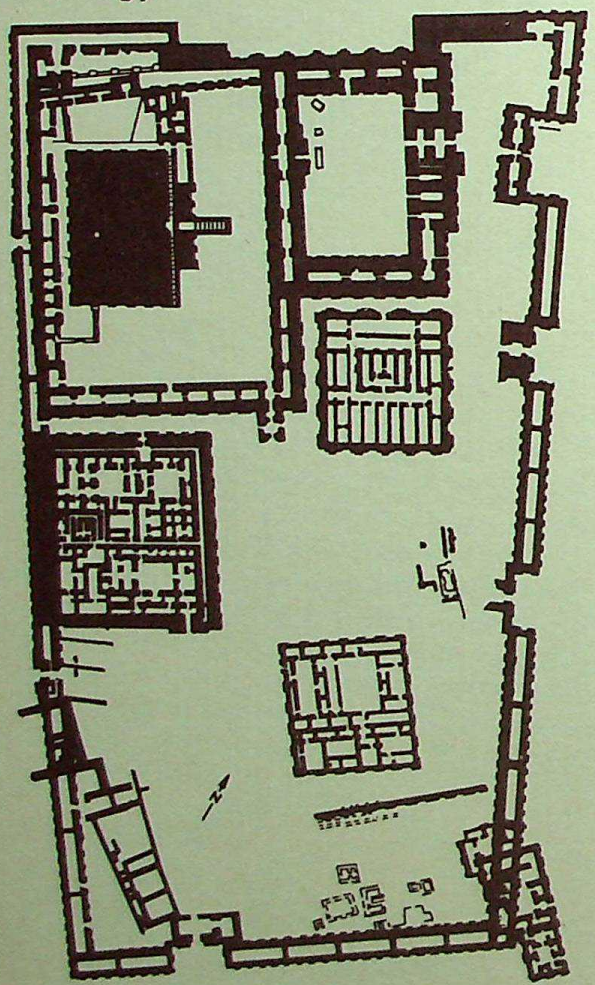


Fig.7.12 Ur: Multiple entrances

It should now be clear that West Asian and Harappan fortifications and gateways differed much, mainly because the basic purpose for which they were built. In this sphere, West Asian knowledge was not at all sought, thus implying an independent development in the Indus Valley. It is extremely important to note that there was no system of multiple walls and multiple gateways, as second and third lines of defences in the Indus cities as was the common practice in Sumer (Whitehouse 1977:48). Moreover, the entrances in Indus 'fortifications' themselves were short and narrow which would not accommodate more than half-a-dozen people at any given point of time.

It is due to this fact that Wheeler once remarked that the Indus towns possessed no general system of urban fortification. We are, therefore, faced with a peculiar situation, the fortification walls were very often massive, as at Kalibangan, but the gateways were simple entry-points to the town. Although, at Surkotada the gateways were slightly more elaborate on plan than they were at other sites in execution they were also very simple. Moreover, the position of the gateways at least inside the township, was not at all fixed. At Surkotada, at least one of the gateways fell into disuse in phase II when a drain was built over it. At Kalibangan, the location of the gateway was at a comparatively obscure place, and the roads passing through it were placed obliquely to the entrance, as if by-passing the pre-existing houses in the township. At Lothal, the gateway is nothing more than a small break in the fortification wall. Mohenjo-daro has, as yet, not yielded any built-up gateway. In comparison, the gateways at Harappa are more distinct and elaborate but their contextual materials make them suitable as entrances more for social gatherings than as defence against military adventures. Many of the Harappan towns are, however, without fortification also such as Allahdino, near Karachi, which provide indirect evidence to the fact that the Harappan cities lived more in peace than in constant danger of war.

The total picture that emerges is as follows. The fortified Harappan towns were of two kinds, some had simple entrances, while others had guard-rooms also, but the guard-rooms were invariably very small, to accommodate only one person. Some of the Harappan 'citadels', such as those at Surkotada and Kalibangan, had partition walls which also had simple entrances, sometimes with steps, but apparently without guard-rooms. Thus, one may easily make out that, by-and-large, the Harappan fortifications were not meant to defend the townships from strong attacks by enemies but were safety measures from robbers and cattle raiders, as Piggott once pointed out. In other words, they had no military function to perform. It is, of course, clearly understood that, along with the palisade, gateways are also important when fortifications are meant to be military defences. Gateways have then to be

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

elaborate, strong and well-guarded. This is hardly the case with Harappan defences.

The fortifications, therefore, served two major purposes, as protection against floods, and as the hall-mark of social authority over the area they commanded. The use of functional terms like 'citadel', 'fortifications', 'bastions', 'garrison' indiscriminately and indiscreetly by scholars, including the late Sir Mortimer Wheeler, has, therefore, been most unfortunate.

ACKNOWLEDGEMENTS

I am extremely thankful to Prof. Lallanji Gopal and Shri Jagat Pati Joshi, my teachers, for their encouragement and guidance in the preparation of this paper. I am also beholden to Dr. B. Narasimhamaiya for all kinds of academic help in this project.

REFERENCES

Albright, W.F. 1949. *The Archaeology of Palestine.* Harmondsworth.

Baumann, Hans 1969. *The Land of Ur.* London.

Bisht, R.S. and Asthana, S. 1979: Banawali and some other Recently excavated Harappan sites in India. In *South Asian Archaeology.* Maurizio Taddei ed. Naples. Vol. I; 22-28.

Dales, G.F. 1962a. A Search for Ancient Sea Ports. *Expedition.* Vol. 4, no. 2; 2-10.

———. 1962b. Harappan Outposts on the Makran coast. *Antiquity.* Vol. 36, 86-92.

———. 1965. Civilization and floods in the Indus Valley. *Expedition;* Vol. 7, 4; 10-19.

———. 1979. Mohenjodaro, some New Data and Interpretations. Paper delivered to *the* International Conference on the Harappan Civilization, Srinagar; unpublished.

Fairservis, Jr. W.A. 1971. *The Roots of Ancient India.* London.

Hawkes, Jacquetta and Woolley, C.L. 1963. *History of Mankind.* Vol. I. New York and Evanston.

Joshi, J.P. 1966. Exploration in Northern Kutch. *Journal of Oriental Institute.* Baroda; Vol. 16, 1; 62-69.

———. 1972. Explortion in Kutch and Excavations at Surkotada and New Light on the Harappan Migration. *Journal of Oriental Institute.* Baroda; Vol. 22, 1-2; 98-144.

Lal, B.B. 1962. A New Indus Valley Provincial Capital discovered: Excavations at Kalibangan and in Northern Rajasthan. *Illustrated London News.* March 24.

———. 1977. Kalibangan's Contribution to the Understanding of the Indus Civilization. *Indus Civilization : Problem and Issues.* Paper presented to the Seminar, IIAS; Simla.

———. 1981. "Some Reflections on the Structural Remains at Kalibangan," *Indus Civilization — New Perspective,* ed. A.H. Dani, 47-54; Islamabad.

Lal, B.B. and Thapar, B.K. 1967. Excavations at Kalibangan – New Light on the Indus Civilization. *Cultural Forum.* Vol. 9, 4 (July); 78-88.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro.* Vol. I. New Delhi. Government of India.

Mate, M.S. 1970. Harappan Fortifications : A Study. *Studies in Indian Archaeology.* H.D. Sankalia Felicitation Volume; 15-84; in New *Indian Antiquary* Vol. IV, Bombay.

Piggott, S. 1950. *Prehistoric India.* Harmondsworth.

Pritchard, J.B. 1975. *The Ancient Near East.* Vol. 2, A New Anthology of the Texts and Pictures; Princeton.

Rao, S.R. 1973. *Lothal and the Indus Civilization.* Bombay.

Soundara Rajan, K.V. 1977. Kutch Harappan. *Indus Civilization; Problems and Issues.* Paper presented to the Seminar, IIAS. Simla.

Stein, Aurel. 1931. *Archaeological Tour in Gedrosia.* Memoirs of Archaeological Survey of India; no. 43.

Thapar, B.K. 1973. New Traits of Indus Civilization at Kalibangan : An Appraisal. In *South Asian Archaeology.* Norman Hammond ed. London; 85-104.

———. 1975. Kalibangan: A Harappan Metropolis beyond the Indus Valley. *Expedition.* Vol. 17, 2; 19-32.

———. 1976. The Concept of the Citadel in the Indus Civilization. Paper presented to the 30th International Congress of Human Sciences in Asia and North Africa. Mexico.

Wheeler, R.E.M. 1947. Harappa 1946 : The Defences and Cemetery R 37. *Ancient India.* No. 3; 58-130.

———. 1967. *The Indus Civilization.* Cambridge History of India, Supplementary Volume; Cambridge.

Whitehouse, Ruth. 1977. *The First Cities.* Oxford. Phaidon.

Indian Archaeology 1955-56 — A Review
Indian Archaeology 1963-64 — A Review.
Indian Archaeology 1966-67 — A Review.
Indian Archaeology 1970-71 — A Review.
Indian Archaeology 1971-72 — A Review.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

8

M. Jansen

Architectural Remains in Mohenjo-daro

The standard account of the architectural remains in Mohenjo-daro is generally confined to descriptions of such exceptional structures as the 'Great Bath', the 'College of Priests' and the 'Granary' in the SD area of the Stupa Mound **(fig. 8.1)**, as well as to certain dwelling houses in the DK-G and especially in the HR areas (Plan 8.1). Accounts of these structures, although competently described, analysed and reconstructed in the reports of Marshall (1931), Mackay (1937) and
40 Wheeler (1968), have been republished since then by several other authors.

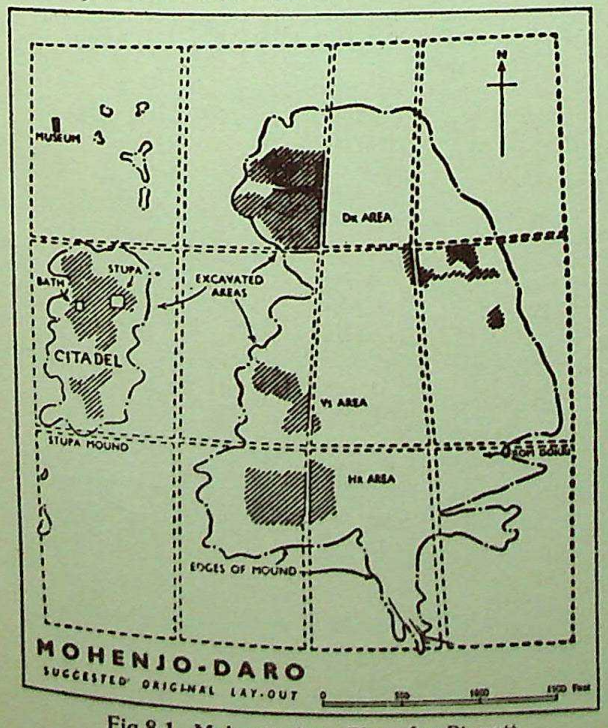


Fig.8.1. Mohenjo-daro: Plan after Piggott

By contrast, an impartially scientific architectural analysis based on the results of further research remains a desideratum to date. Recent attempts to fill this lacuna (cf. Fentress 1976; Jansen 1978, 1979, 1980; Sarcina *et al.* 1977, 1980) proved unsatisfactory, due to the continuing absence of a complete documentary survey of the architectural remains in Mohenjo-daro since the first archaeological reports, of high quality for their time but unscientific by modern standards, were published. In order to rectify this situation, in November 1979, the German delegation of the Department of Architectural History of the Technical University of Aachen started rechecking all architectural remains excavated to date. Before the delegation commenced work on the site, a chance discovery was made which lent new urgency to their task of recording all extant structures.

In February 1979, the author was invited by G. Dales, Berkeley, California, to complete the architectural documentation of the latter's 1965 excavation which, unfortunately, circumstances had prevented him from finishing. In the course of our subsequent stay in Mohenjo-daro, a copy of a map, long forgotten, was rediscovered in the museum library. Obviously drafted from an aerial survey photograph the scale 1:2000 map **(figs. 8.2)** shows an excavated area east of the VS area hitherto unknown to us. Having located this 'new' site we were surprised to find an excavated area approximately 100 × 100 m in extent which apparently had never been published in the form of a photograph or large-scale map.

The site itself was in poor condition although

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

some walls were still standing to a height of 2-3 metres.

Although some preservational measures had already been carried out on a few houses by the local authorities, these were so minor that they did not detract from the importance of the site as a primary source **(Plan 8.3)**. The preservational measures in question, which did not involve basic structural alterations, included the perforation of a number of walls prior to inserting horizontally laid concrete insulation material as protection against rising damp and salts. The Director of

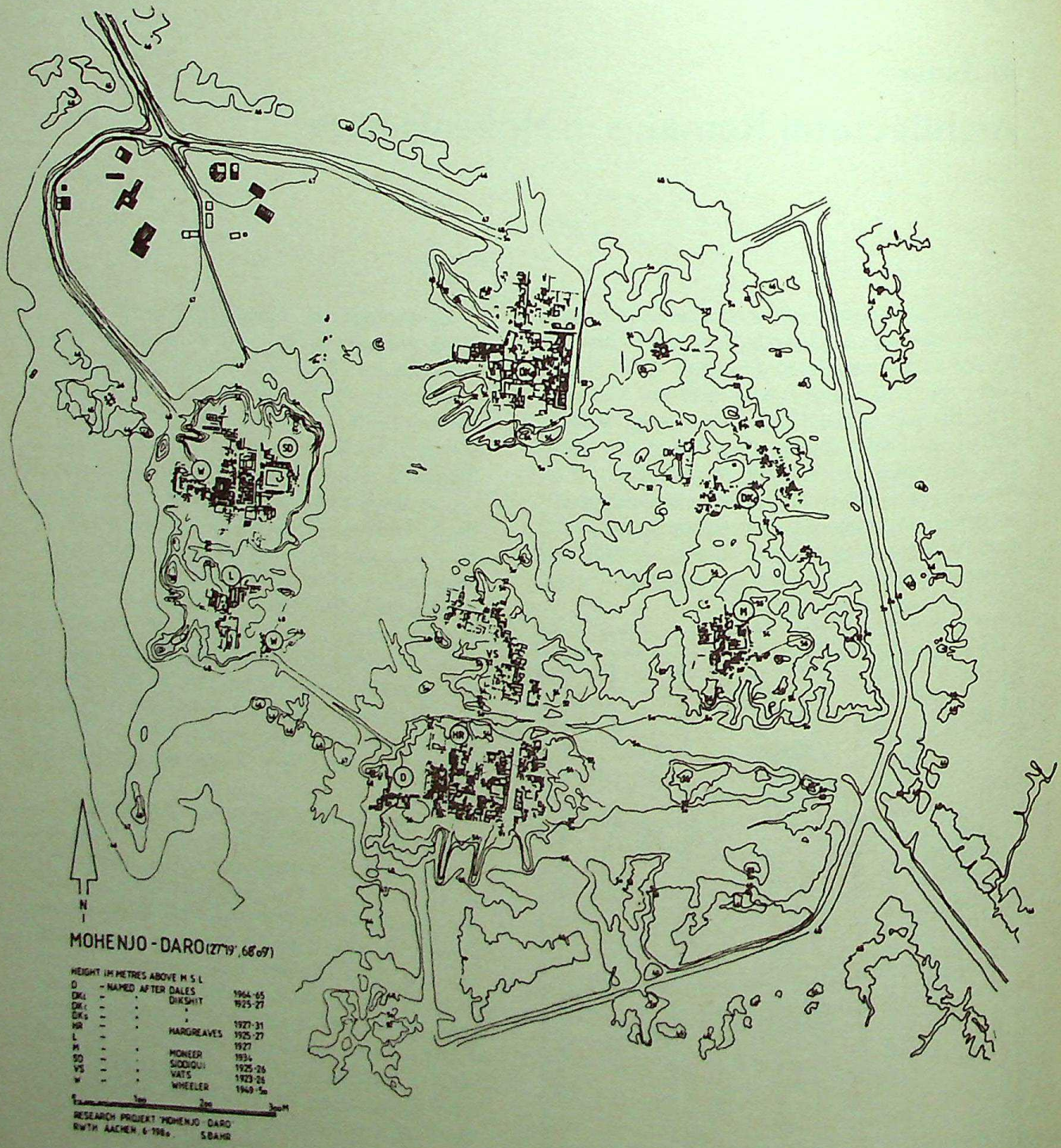


Fig.8.2. Mohenjo-daro: Architectural remains in different areas

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Archaeology, Ishtiaq Khan, kindly granted our request to cease all preservation work until we should have documented the architectural remains in their original state.

Jansen and I visited the Moneer Site in February 1979 and were astonished at what we saw. The size of this neglected excavation is impressive enough in itself but the general appearance of the architecture gave us a much different feeling than that which we have had from other parts of the city.

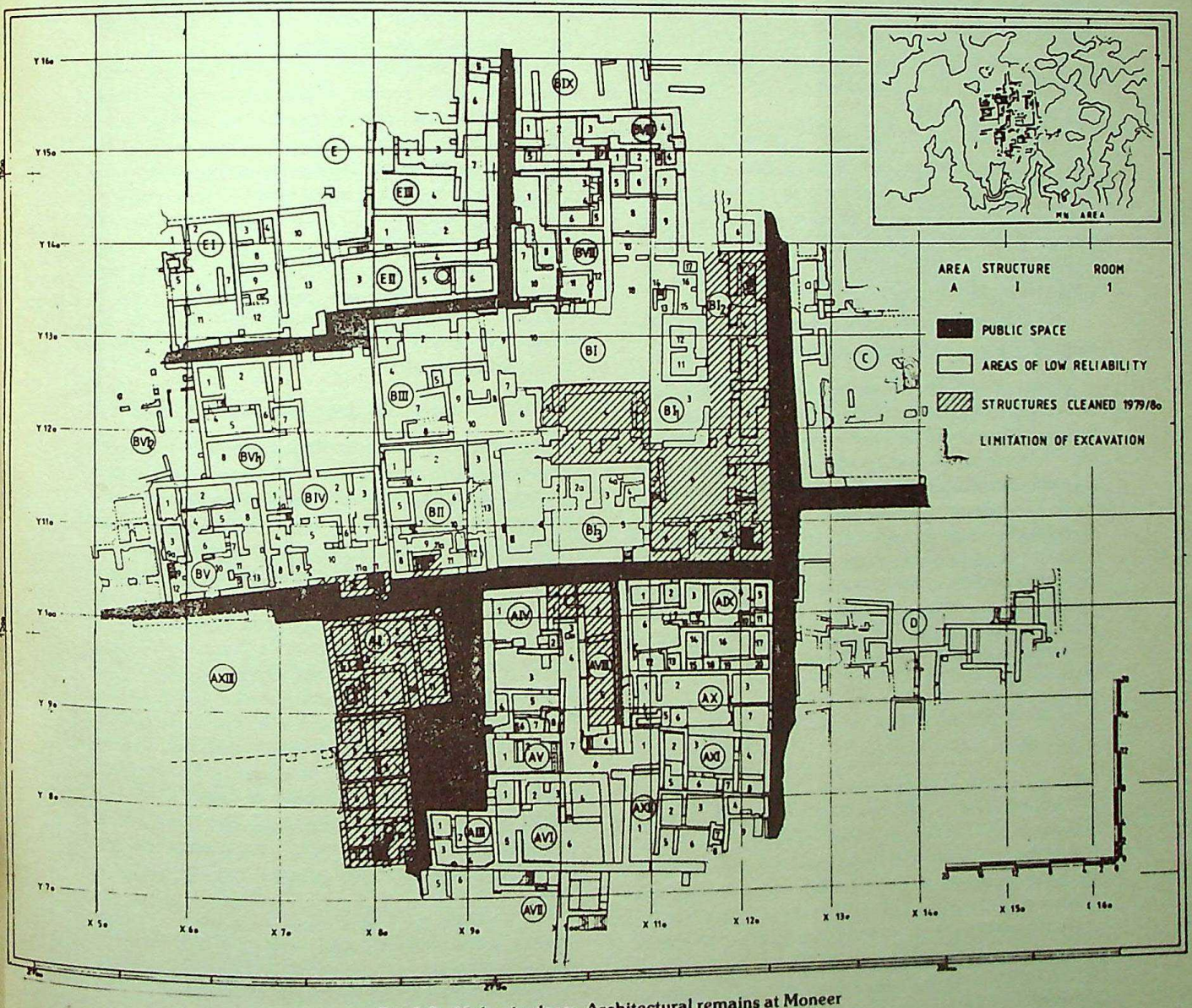


Fig.8.3. Mohenjo-daro: Architectural remains at Moneer site

Under these conditions we were able to commence Phase I (1979-80) of the documentary survey by recording the excavated remains of the area which we later name the 'Moneer Site', after one of its probable excavators, Q.M. Moneer.

Dales presented a preliminary report on the Moneer Site to the International Conference on the Indus Civiliztion, Srinagar (Kashmir), in June 1979 in which he noted:

The structures seem smaller, with thinner walls in general and though neatly oriented and arranged along straight streets and lanes, they seem to be more crowded. This is an impressionistic view only and must be checked by actual measurements (Dales 1979: 3-4 unpubl.).

As neither of us knew when and by whom this excavation had been executed, Dales undertook the investigation of the history of the site. In the course of his researches, he encountered some

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

notes made by Asko Parpola and I. Mahadevan (Dales 1979: 3) recording the discovery of unknown seals in either the DK-B or the DK-1 (?) (Moneer Site) areas. With the assistance of these notes and private discussion with Mohammad Siddique, former custodian of Mohenjo-daro, Prof. Dales came to the conclusion that this area had probably been excavated by Q.M. Moneer in the period 1935-40.

Further research by the author confirmed Dales' presumption concerning the excavator. The rediscovered excavation was termed the DK-J area. Notes relating to the excavation are contained in the Annual Reports of the Archaeological Survey of India (*ARASI* : 1930-34 : 51, 72; and in *ARASI* 1936-37 : 41 ff).

The following citations are from the more pertinent of the above references:

A brief report will be found after Mackay's contribution giving an account of the excavations on a small scale which K.N. Puri, custodian of the museum at Mohenjo-daro and Q.M. Moneer conducted during 1933-34. As, unfortunately, there is no photographer and no draftsman attached to the site any more, no illustrations can be given of their latter diggings. Scholars all over the learned world will deeply regret that the work so splendidly begun at this remarkable site cannot at present be brought to completion owing to the cut of grants for this purpose. As most readers will realize, the area of the ancient city of Mohenjo-daro is enormous, and only an infinitesimal part of it has been explored so far (*ARASI* : 1930-34 51).

Q.M. Moneer; writes on his own work during 1933-34:

While supervising the preparation of a conservation estimate at Mohenjo-daro I utilized a period of leisure between January 15 and February 6 1934 to resume the trial excavation of the DK-J Site, where work had been started by K.N. Puri, the custodian of Mohenjo-daro Museum, about the beginning of December 1933. This site is a small mound measuring about 250 ft from north-south and 120 ft from east-west and is bisected by a nine ft wide street that runs across it from north to south. Starting with the clearance of the street I followed up the excavations over the area adjoining it on the east. Over its entire length of 250 ft the street has been cleared down to its original level which, owing to a gradient towards the north varies from 8′ to 11′ at different points in its course. 10′ 4″ below the top of the walls of the houses flanking it on either side, the street was found to possess a covered drain coursing along its centre, and with this were connected a number of vertical drains and chutes issuing from the back walls of surrounding buildings.

Up to 5′ below the surface of its debris deposit, very few finds of note were recovered from this street but below that level they came in greater abundance.

Clearing of the eastern half of the mound revealed 56 rooms of different dimensions representing the remains of the three uppermost strata comprising the Late Period of Mohenjo-daro. Those at the top are rather poor and thin in their construction but what survives of the remaining two strata is comparatively substantial.

Antiquities recorded from the street and the rooms mentioned above number a little over a hundred. Noteworthy among those found in the street are two fragments of a shell pin (106), one copper fork with three prongs (107), two complete and several fragmentary steatite seals, a small linga-shaped stone object, cuboid stone weights of different sizes and two very small, crushed beads of gold leaf. Beside a number of pictographic seals the finds made in the western section comprise a variety of objects of everyday use in shell, stone, terracotta, copper and faience. A copper casket 7″ high and 9.5″ in circumference was found in the corner of a room of the second stratum and sent to the Director General of Archaeology (ibid: 72).

Excavations at Mohenjo-daro by K.N. Puri:

An area of 150 by 120 ft was excavated in DK Site Section I where some excavation work had been previously done in the year 1933-34. Five houses were completely excavated and three partially, all lying between and on the sides of two narrow lanes running E-W parallel to each other. The buildings excavated have not been opened below the Late Period level, the digging being stopped with the indication of door sills, pavements, drains and the last tread of the flight of steps. In all, about 300 antiquities were discovered. These comprise 29 seals, 16 showing the unicorn, one each a tiger, a rhinoceros and a short-horned bull and six rectangular seals without any animal device. A faience seal has two rectangular sockets which were, in all probability, once inlaid with the same material. Among other objects were 4 pointed jars bearing seal impressions; a number of copper tablets and other objects of copper and bronze; a golden fillet in pieces; weights of chert; beads of faience, stone, paste, etc. and stone, shell, ivory and pottery objects of the usual shapes and types.

The discovery of a good number of beads, 16 small weights, a pair of small copper scale-pans together with a fulcrum rod made in a room directly accessible from the lane suggests that this was a lapidary shop (*ARSI* 1936-37: 41).

According to these reports the excavation was carried out in two phases, between December 1933 and January 15 — February 6 1934. The excavated site was termed DK-J.

Research by the author, in the museum library in Mohenjo-daro brought to light, handwritten field registers dating to the original period of excavation.

The objects entered in the registers include numbered finds with the prefix DK-J which we

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

suspect to refer to the actual discoveries made in the Moneer Site.

This would appear to indicate that, contrary to previous assumptions, actual records of objects excavated in the Moneer Site do exist.

Documentary Survey Of The Moneer Site

Phase I 1979 - 80 (Plan 8.3)

Location

The Moneer Site is located about 200m east of the VS area (Plan 8.1, axis 28-3 and about 130 m south of the DK-A, B and C areas (Plan 8.1, axis O-Q). The average altitude of the site is about 54.80 m above mean sea level and about 4.5 m above the level of the surrounding plain. The excavation covers an area 100 × 100 m approximately in extent.

Reliability of Extant Sources

As the Moneer site was—and still is—in very poor condition (due to the detrimental effects of 50 years' exposure to the elements), the authorities responsible for the conservation of Mohenjo-daro undertook the preservation of the structures uncovered on the site by inserting an insulation course of horizontally laid concrete slabs (cf. Master plan 1970). Such conservation methods made certain physical alterations to the structural fabric unavoidable. Walls already treated in this way and consequently of little or no value as source material are marked on the plan (Plan 8.3).

Nomenclature of Remains

In order to distinguish any striking feature which several structural units might have in common, certain decisions regarding nomenclature and enumeration had to be taken and relevant investigations carried out. The theoretical basis for the terminology implemented and a summary of the nomenclature and enumeration systems are set out in what follows. The area excavated according to archaeological principles was broadly classified as being composed of ' streets ' (recognizable as the interconnecting public access routes) and 'non-streets' which delimit the streets and fulfil other functions.

The non-streets which are clearly marked off into blocks by streets were named A, B, C, D and E.

Each of these sub-non-streets was subclassified — following analysis of the lay out of the exposed brickwork—into 'house units' termed D I, D II, etc., using Roman numerals.

Each unit was further subdivided into compartments comprising it (whereby 'compartment' is understood in a general sense as a three-dimensional enclosed area which may or may not have been roofed), labelled with Arabic numerals B I:1, B I:2, etc.

With the exception of Block E, the numbering of the blocks runs clockwise from south-west to south-east, while that of the house units starts with a particular corner unit and radiates outwards thus enabling future discoveries to be included. The numbering of the compartments generally commences at the north-west corner of the house unit in question.

To give direct information, the nomenclature for the streets was chosen as following:

(i) According to the direction, the streets were named either North-South (N-S) or East-West (E-W).

(ii) In taking into account that further streets, belonging to this complex will be excavated, the widest street in the east-western direction and the north-southern direction were termed (5) (E-W-5) respectively (N-S-5).

(iii) According to the general grid system introduced by Marshall (Plan 8.1), the growth of numbering is from east to west and from north to south. This system was kept in numbering the streets.

Modifications

This system had to be modified, in some respects due to certain practical limitations :

(i) Not all units or compartments were clearly distinguishable beneath the accumulated rubble; and

(ii) From the very start of the operation, provisional nomenclatures had to be used for classifying photographic records, etc. which, although not conforming to the general system finally adopted, were later incorporated into it on account of the expense that a change would have entailed.

Enumeration of Structural Entities

In keeping with the traditional numbering system hitherto applied to the other areas excavated, the structural remains on the Moneer Site are numbered according to blocks—clusters of undetached house units bordered on all sides by public streets (Plan 8.3).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

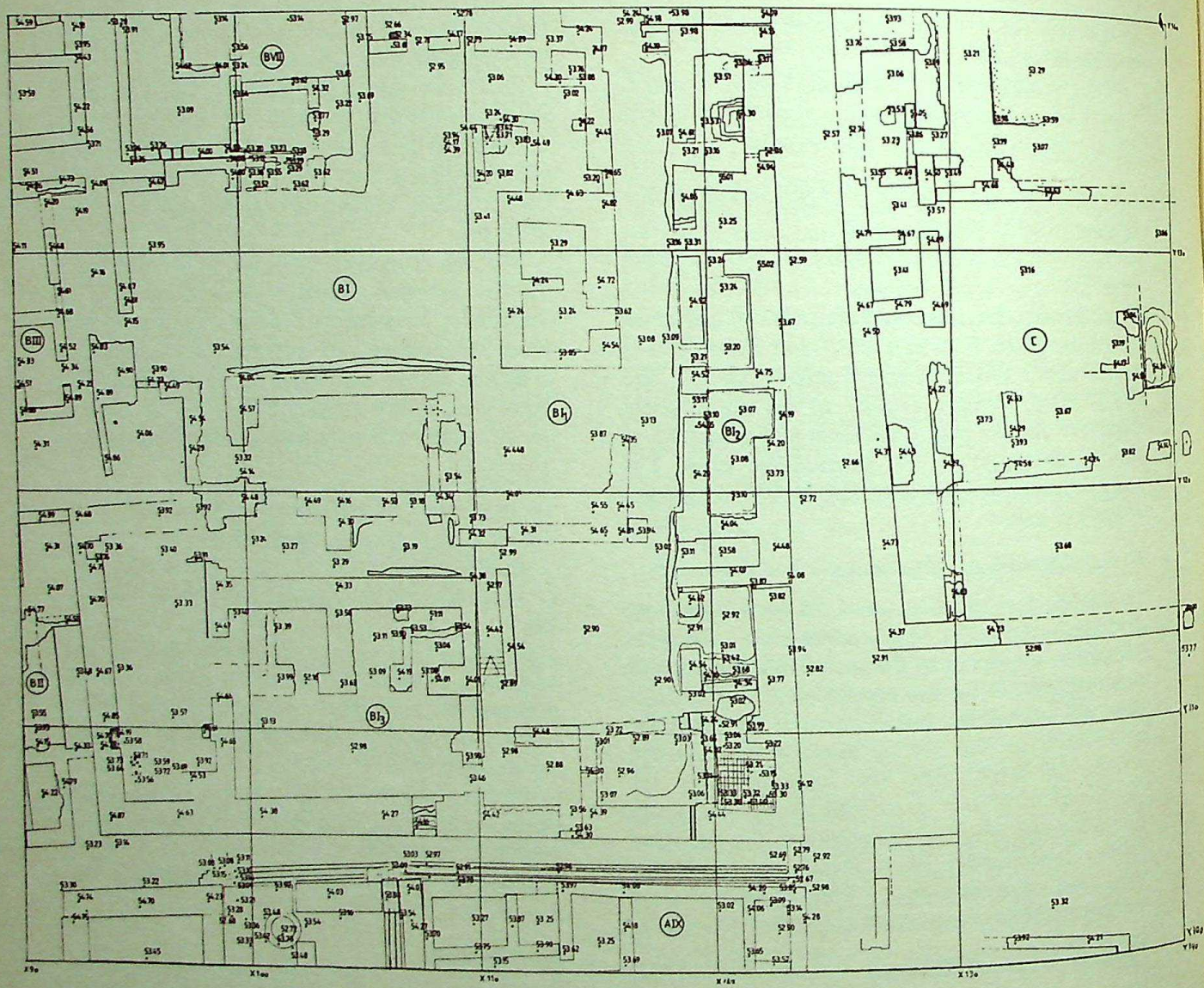


Fig.8.4. Mohenjo-daro: Details of structures at Moneer site No. BI, 1:3

The 5 such clusters uncovered to date are labelled Blocks A,B,C,D, and E respectively. Block A occupies the southern section of the excavated area, separated from Block D to the east by Street N-S-5 and from Block B to the north by Street E-W-5. Block B takes up most of the northern section including the central area, bounded by Streets E-W-5 on the south and N-S-5 on the east.

Block C lies in the north-east, separated from Block B to the west by Street N-S-5 and bordered on the south by Street E-W-4 which divides it from Block D in the south-east corner of the excavated area. Block E in the north-west bounded by Streets N-S-6 on the east and E-W-3 on the south was originally included in Block B from which it was later separated. Block E thus does not conform to the clockwise numbering of the blocks from south-west to south-east.

The distinct structural entities of which the clusters of buildings are composed are termed 'house units', whereby these are not necessarily places intended for habitation. Following provisional identification of these subordinate structures Block A was subdivided into 12 house units, Block B into 9 and Block E into 3. Blocks C and D have not yet been subdivided as they still have to be cleaned and their house units remain to be identified more precisely. The enumeration of the house units making up each block uses Roman numerals strating with a fixed corner unit, thus enabling any further units which may be un-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

covered in a particular direction to be simply numbered in sequence.

As a rule, the enumeration of the individual compartments within a given house unit starts at the north-west corner and zig-zags southwards, using Arabic numerals. Again, the term 'compartment' is used in a strictly descriptive sense as a three-dimensional enclosure which may or may not have been roofed, and may have served any conceivable purpose.

The system used to number the walls incorporates the cardinal points of the compass to indicate position and aspect. Starting with number 1, which always denotes an outside wall, the successive interior walls are numbered in sequence, so that the innermost walls bear the highest numbers. The label N 1 N thus indicates the north face of an outside north wall.

Street System

In the following description, the term 'street' is used to denote simply one of the interconnecting public access routes without necessarily implying any further specific functional use like commerce etc.

41 Street N-S-5 traverses the eastern part of the excavated area on a north-south axis, increasing in width from 2.20 m at its present northern section, where, however, only the west side of the street is discernible. About 60 m of Street N-S-5 have been excavated to date.

42 Further to the west Street N-S-6, which runs parallel to Street N-S-5 for about 28 m, makes a sharp turn west to form Street E-W-3, still 1.8 m approximately in width. After turning south and almost immediately west Street E-W-3 disappears into the unexcavated earth after about 16 m, having decreased in width from about 1.8 m at the start to 1 m at the end of its angular course.

43 A third street on a north-south axis, Street N-S-7, about 4 m wide, branches off Street E-W-5 southwards. After about 10 m, it opens out to form a little public square 8 × 11 m approximately in size. At the south-west corner of the square Street N-S-7, now 1.4 m wide, continues south for 6 m before turning west under unexcavated ground.

44 Evidence of only one main thoroughfare on an east-west axis has been uncovered : Street W-W-5, 2 m approx. in width. Traceable for about 66 m, this street branches off Street N-S-5 in a westerly direction where it eventually loses itself beyond the limit of the excavation.

A vaguely defined public area, leading off Street N-S-5, in the opposite direction to Street E-W-5, is labelled Street E-W-4.

Spatial Distribution of Structural Remains

Starting with a detailed description of the architecturally most prominent structure in Block B, the following account attempts to reconstruct and analyse the growth pattern of the so-called 'house units' occupying much of the Moneer Site. It must be stressed once again that no functional significance is to be attached to such descriptive labels as 'house unit', 'compartment', etc. here used in the absence of a suitable, alternative neutral nomenclature. **(fig. 8.4).**

The present excavated area is dominated by a conspicuous building complex occupying that portion of Block B which directly overlooks the junction of Street N-S-5 on the east and E-W-5 on the south (Plan 8.4). This dominant complex, comprising the subsidiary enclosed areas 1-3 of the house unit B 1, is fronted on the east, by a practically unbroken facade (wall E1E) 34 m in length while 2 entrances, which had originally interrupted the 30 m of frontage (wall S1S) taken up by the complex on the north side of Street E-W-5, were evidently blocked up at a later stage. In contrast to the clearly defined limits on the east and south neither the northern nor the western limits of the complex can as yet be determined with any certainty. The most striking architectural feature of the complex, which occupies an area almost 800 sq. m in extent, is the extreme thickness of the walls—2 m approximately (the length of 6 ½ bricks). The brickwork is constructed of bricks of mixed quality, ranging in hardness and durability from lightly baked to thoroughly fired. The ground plan of this complex is characterized by a series of so-called 'courtyards' (larger compartments of unknown function which may or may not have been covered over) generally enclosed by single rows of smaller compartments. Access to these compartments, which rarely intercommunicated, is via the 'courtyards'. Access to the entire complex is via a passageway running parallel to Street N-S-5. The northern portion of this passageway, whose outside entrance in the north is still hidden under a mound of rubble, is lined on either side 45 by a further row of compartments, that on the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

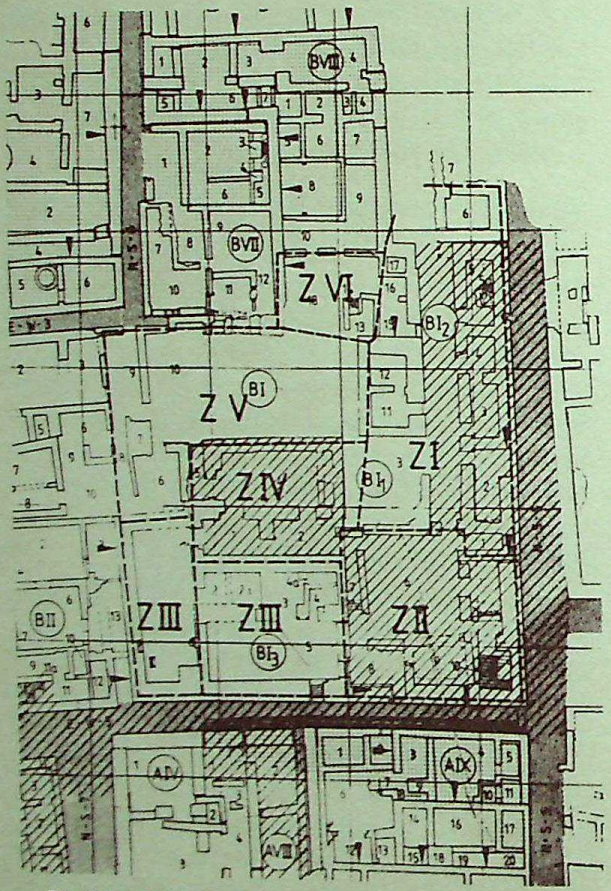


Fig.8.5. Mohenjo-daro: Details of structures at Moneer site No. BI, zones I to VI

east side, separating the passageway from the street. As far as can be determined at this stage of the excavation, the complex can be broken down structurally into 6 zones according to their relation to the interior system of intercommunicating access routes **(fig. 8.5).**

Starting at the entrance and proceeding on the course dictated by the ground plan of the complex, Zone 1 comprises the entrance passageway (about 20 m long and 2.2 m wide) and the 2 parallel rows of compartments lining it already noted (Bl-2: 1, 2, 3, 4, 5 and 6 on the east side, Bl-1: 17, 15, 12, 11 and 3 on the west side) of which 4 on either side seem to have been built as symmetrically reversed pairs.

Just south of a construction formed by a brick pillar (cross section 0.8 × 0.8 m approximately), probably added later, the passageway opens out to a 'courtyard' 7.5 × 7.5 m approximately. In extent which is bounded on the north by the south wall of Bl-l: 3. This 'courtyard', Bl-3: 6, together with the compartments Bl-3: 8, 9, 10, 11, and 12 for which it serves as a central point of access, constitutes Zone 2. Bl-3: 6 also provides access to other parts of the complex from the north-west and south-west. A free-standing section of the wall retaining the fill between it and the west side of the 'courtyard', may mark the vestigial foundations of a flight of steps leading 46
upwards from the south (Bl-3: 7.) Zone 3, situated to the west of Zone 2, comprises the substructure of compartments Bl-3: 2, 3 and 4 and the probable 'courtyard' Bl-3: 1 and 5. Only the foundations of a partition wall dividing Bl-3: 2 into 2 and 2a can be tentatively reconstructed. Compartment Bl-3: 4 (cf. T.I. for detailed dimension) was also partitioned—probably during the final habitation period—by a temporary wall, one brick thick, into the northern section (4a), entered from Bl-3: 3, and a southern section (4), entered from the 'courtyard', 10 × 4 m approximately in extent on an east-west axis. This can only be entered from the south-east corner via Bl-3: 8 (Zone 2), which provides access to the compartments Bl-3: 2, 2a, 3 and 4 lining it on the north through openings 0.8 m approximately in width. Originally, the 'courtyard' could also be entered from Street E-W-5 by an opening in the massive south wall which was subsequently blocked up BI-3: 1, 11.5 × 4 m in extent 47
on a north-south axis, in all probability also a 'courtyard', adjoins the west side of the 'courtyard' BI-3: 5 from which it can be entered only via BI-3: 2. The most striking feature of Zone 3 is the thickness (up to 2 m) of the enclosing and interior walls of the 2 'courtyards'.

Immediately to the north of zone 3 lies Zone 4, comprising the 2 compartments Bl-1: 1 and 2, almost symmetrical opposites of each other, which are built up against the north face of the wall enclosing zone 3 on an east-west axis, as well as the 'courtyard' Bl-1: 4 facing the compartments from the north. Compartment Bl-1: 1 has access to both 'courtyards' Bl-1: 4 and Bl-3: 1 (Zone 3) which also opens onto Bl-1: 4, functions at the same time as the connecting link between 48
zones 4 and 2 ('courtyard' B 1-3: 6) Zone 5, north of Zone 4 and west of Zone 1, would consist of the compartments provisionally named Bl-1: 6, 7, 8, 9, and 10. A compartment, more like a corridor (Bl-1: 5), would also appear to belong to this zone as it connects Bl-1: 10: and Bl-1: 4 (Zone 4) by skirting the thick enclosing wall of the latter 'courtyard' in a northerly direction.

Precise classification, however, will have to

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

await the results of further investigation into the function of the structural enclosures in this area of the excavation. When freed of rubble, Bl-1: 10, for example, may turn out to be a further 'courtyard' entered via Bl-1: 9 from the south-west.

Similarly Zone 6, a small area bordered by Zones 5 on the south and 1 on the east, also remains to be investigated more thoroughly.

It consists of the entities Bl-1: 13, 14, 16 and 18, including a staircase (14) and probably a platform (13).

As a result of cleaning operations in the Bl complex, carried out in preparation for the documentary survey, earthen floors in Bl-2 and
49 in parts of Bl-3 were rediscovered. A tiled floor
50 was revealed in one compartment only—Bl-3: 10. Obviously the earthen floors had already 51 been cleared of rubble during the initial dig in the 1930's as no artefacts of any kind were brought to light in the course of cleaning. These floors had been laid at a depth of 52.90—53.10 m above mean sea level.

Judging by the siting of the other structures in Block B in relation to the Bl complex, the latter constitutes the original building to which all others are secondary extensions. Within the Bl complex itself, the direction of expansion was evidently south-north. Clearly, the decisive factor in the spatial development of Block B was the permanent fixing of the lines of the arterial streets running east-west and north-south **(figs. 8.6)** House unit BII (11.5 × 14.5 m - 167 sq. m in extent, prop-1: 1.26) was built on to unit Bl using

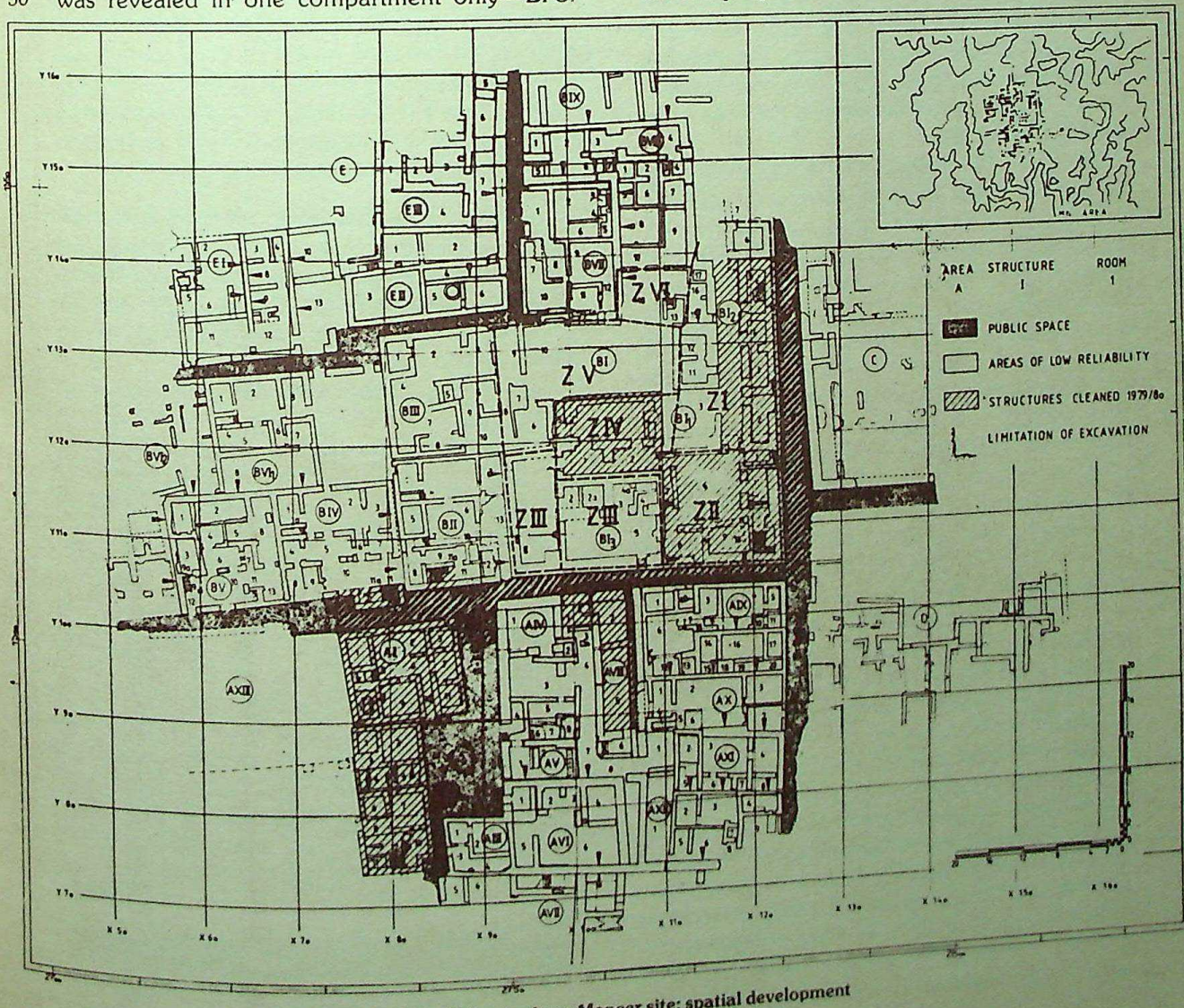


Fig.8.6. Mohenjo-daro: Moneer site; spatial development

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the west side of 'courtyard' BI-3: 1 as a prefabricated east wall. On the south side, unit BII protrudes 0.6 m (the thickness of wall BII S 1) into Street E-W-5 beyond the line of its north side as fixed by wall B1 S1 **(fig. 8.7).**

Unit BIV **(fig. 8.8)**. was built on to the west side of BII, partly using the west wall of compartment BII: 8 but with an additional east wall of its own further to the north. In the south-east corner of the unit, an extension incorporating a staircase, a platform and a 'bathing platform' protrudes 2 m into Street E-W-5 reducing it at this point to a passage merely 1.5 m approximately in width. Unit BIV (13.0 × 12.5 m - 162.5 sq.m in extent, prop. 1: 1.04) and the neighbouring unit adjoining it on the west BV (11.5 × 12.5 m - 143.75 sq.m in extent, prop. 1: 1.08) **(fig. 8.8)**; differ little in area or proportions. Here also, the direction of growth is westward. The western demarcation of unit BV marks the limit of the area excavated in this direction.

Unit BVI **(fig. 8.8)** situated north of BIV and BV, was erected at a later period still. Its east and west boundary walls are built perpendicular to the outside north walls of the units BIV and BV. Dispensing with a south boundary wall of its own, BVI is sited in such a way that the dividing wall between BIV; and BV ends at the centre of its south side. This noteworthy shift westwards by half a house length created the space for a large open yard 11.5 × 7.5 m in extent on a north-south axis enclosed by the east, north and west walls of the house units BVI, BIV and BIII respectively. Bounded on the north by a wall broken by 2 principal entrances from Street E-W-3, the yard could also be enterd via compartment BII: 1 which overlooks its south-east corner, (Plan 8.8) To the east of the yard lies unit BIII, (Plan 8.8) divided from its immediate neighbour on the south BII, by an outside south wall of its own. Both house units are equally wide and built on the same north-south axis.

The units BVII, BVIII and BIX, added on beyond the northern limit of the BI complex, could not yet be examined in more detail as the exposed brickwork had been renewed as part of the restoration process (Plan 8.3). As far as Block B as a whole is concerned, however, gradual expansion northwards and westwards from the primary building. the extensive corner BI complex, may be ascertained. Apparently the expansion westwards proceeded unit-by-unit in a terrace 2 houses deep, built back-to-back. The result is a double row of consecutively built units of modest dimensions (each 150 sq. m approximately in extent) with access either from the north (Street E-W-3), or from the south (Street E-W-5) (Plan 8.6.)

The comparably domineering influence of a corner position on the pattern of subsequent buildings in a particular area can otherwise be attested to only in the DK-G north area (Block 13) and in the case of the 'Great Bath' in the SD area.

BLOCK E: Merely 3 structures of the north-west block have been uncovered to date, of which 2 (EII and EIII) could not be investigated any further due to their having already been renovated. The functional aspect of the corner house unit EII (occupying the angle formed by the junction of Streets N-S-6 and E-W-3) is underlined by the presence in compartment EII: 5 of the only well found so far in Blocks B or E (Plan 8.3).

BLOCK A: This entire block, which continues under unexcavated ground on the south had already been restored so that attempts to distinguish the compartments making up its ground plan, especially in the eastern portion of the block, proved unusually difficult.

Readily identifiable from the ground plan are

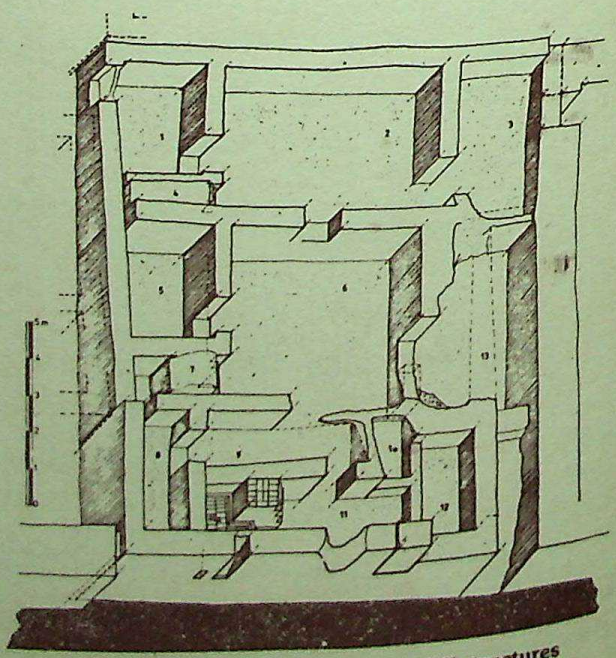


Fig.8.7. Mohenjo-daro: Moneer site; BII structures (isometric view)

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

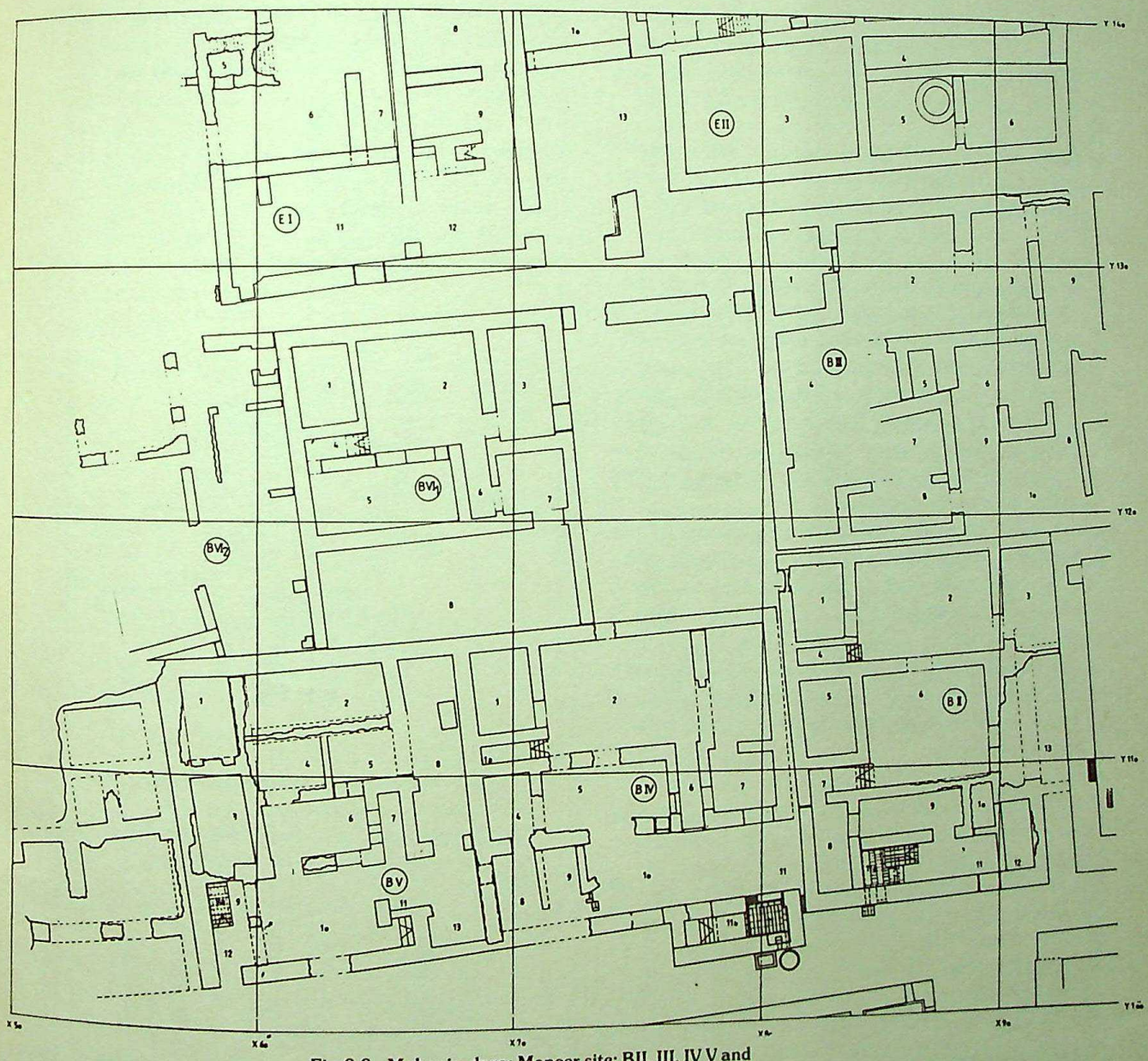


Fig.8.8. Mohenjo-daro: Moneer site; BII, III, IV V and VI areas

the units AI **(fig. 8.9)** and AII **(fig. 8.9)**, which mark the western limit of the present stage of excavation. They form a short terrace of detached house units, each enclosed by a fully developed exterior wall. Access to the units, which lie on a north-south axis, is from Street N-S-7 which opens out to form a public square at this point.

It may be pertinent to note that the labels AIV to AXII do not necessarily mean that the structures to which they refer are house units in the sense of dwellings; as in the rest of the documentary survey, they are used here, provisionally, as neutral designations until further light can be thrown on the functional nature of the structures in question. As far as can be determined at this stage, building work here, in the eastern portion of Block A, commenced at the south and advanced northwards leaving a north-south alignment of structures most of which are built on an east-west axis. Apparently, built back-to-back in a double row, as in the case of part of Block B, the individual units are entered either from the east (Street N-S-5), or from the west (Street

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

N-S-7, depending on which direction they face. Unit A-VIII is the only one with access to Street E-W-5 from which a narrow opening leads to a public well in compartment AVIII: 1 (Plan 8.3).

BLOCKS C & D: These 2 blocks, lining the eastern edge of the excavated area, are in a fragmentary condition and have yet to be cleared.

CONCLUSION

This contribution is intended merely as a preliminary descriptive account of the Moneer Site in general. Before concluding, however, and without going into exhaustive detail which would break the planned limits of this publication, attention may be drawn briefly to the first steps currently being taken towards a comparative analysis of the fragmentary architectural remains in this area of the excavation.

Closer inspection of the ground plans of the blocks which have not yet been restored (Plan 8.3), especially that of Block B, reveals that a particular structural shape apparently forms a recurring pattern **(fig. 8.10)**. The house units concerned are BII, BIII (with modifications), BV and BVI in Block B, AI in Block A and EI in Block E (Plan 8.3). These units share the following features:

[A] Similar grid plan;

[B] Similar exterior dimensions (150 sq.m approximately in extent) and proportions (prop. 0.8 to 0.9);

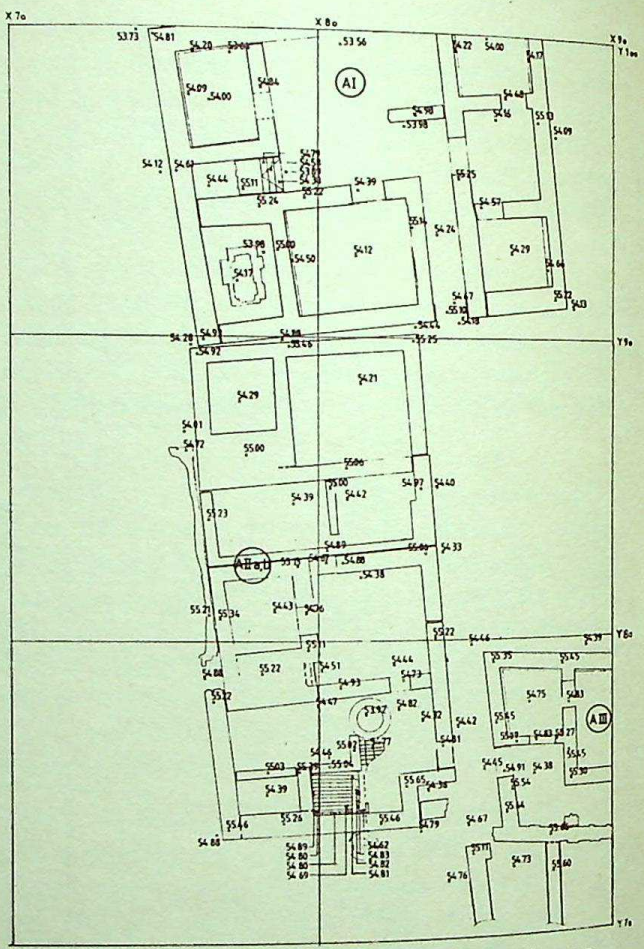


Fig.8.9. Mohenjo-daro: Moneer site; AI and II areas

[C] Similar interior access systems; and

[D] Compartments in corresponding locations in these units: have similar dimensions and proportions.

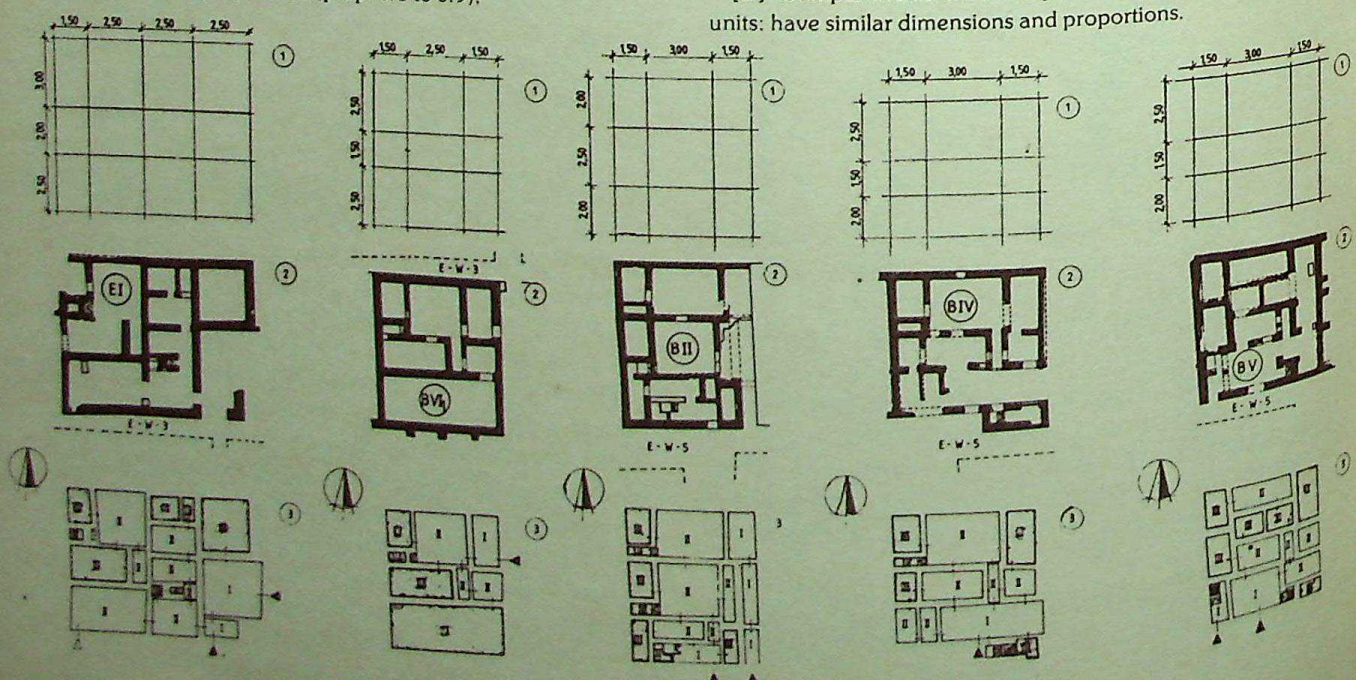


Fig.8.10. Mohenjo-daro: Typology of houses

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

With regard to point [A], the grid plan in question consists of a triple axis whose X and Y axes can be determined. The walls erected along these grid lines—not necessarily along their total length—comprise the structure of a house unit of this type. In the units BII, BIV, and BV and—except for one deviation—BVI1 the ratio of the intervals between the north-south axes is 1:2:1. Of these units, merely BII and BVI show the same symmetrical proportions in relation to the east-west axis.

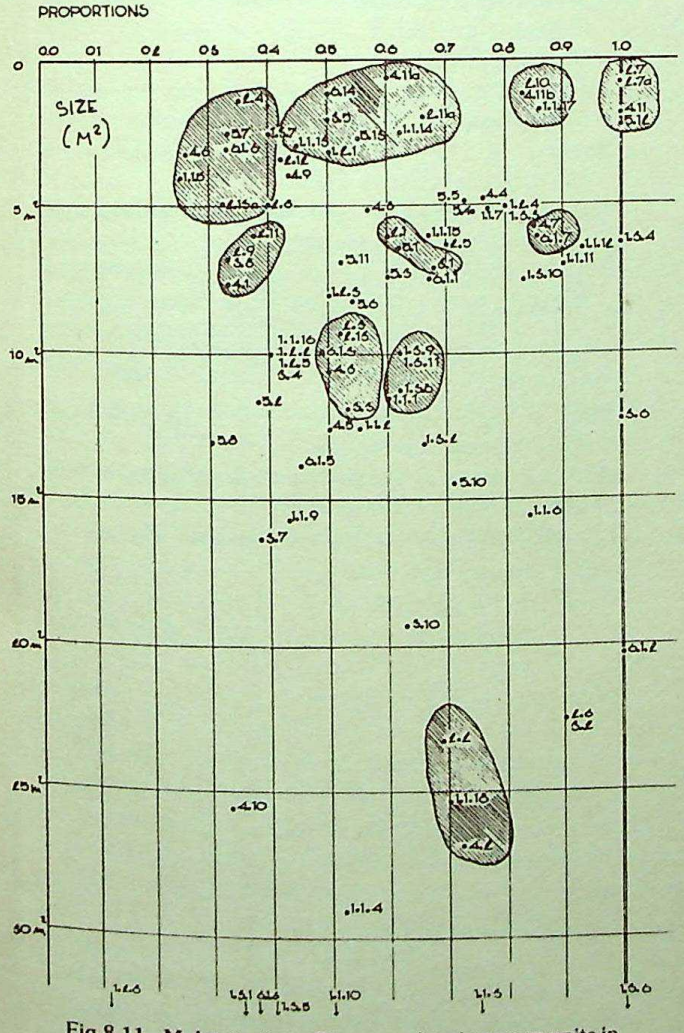


Fig.8.11. Mohenjo-daro: Diagram showing room units in areal proportional relation

With regard to point [C] concerning the interior access system, the following points may be noted:

[i] With the exception of BVII, all these units open southwards onto a public thoroughfare via an anteroom lying parallel to it on an east-west axis; in 2 instances (BII and BIV) a staircase leading to a 'bath platform' with a connecting drain to the street is built on to the anteroom.

[ii] In all these cases, although very rudimentary or even bricked up later in some units, a narrow passageway leads northwards from the anteroom, past a central compartment lying to the west of it, to the rear north of the building. Here the passageway enters a large compartment which provides access to further small compartments opening off it to the east and west the latter consisting in almost all cases of a staircase and an adjoining compartment on the north.

[iii] Classifying the compartments according to degree of accessibility and function (I—those opening directly onto public areas, II—throughways for internal traffic in transit, III—termini), it transpires that clusters of terminal compartments (Category III) predominate in the west and east portions of the house units.

From this investigation, it may be concluded that the present layout of BV, for example, is no longer representative of the original structure, but that the rear of this unit had apparently been bricked up at a later stage. This observation is confirmed by the evidence of the extant brickwork which shows that the inner dividing wall had been set at an angle to the outer boundary wall of the unit.

With reference to point [D], when all the compartments of the house units are grouped according to area and proportions and entered on a graph, it immediately becomes apparent that, as a rule, certain compartments are of certain dimensions and proportions **(fig. 8.11)**. On the accompanying graph the X axis represents the area and the Y axis the ratio of width to length. The resulting concentrations of frequencies reflect the spatial similarity of compartments in similar locations and with similar functions, e.g. transit compartments (Category II) are concentrated in the 0 - 5 sq. m range between the proportion scale numbers 0.8 and 0.9.

The findings of this preliminary investigation may be summarized briefly in the form of a provisional statement.

At least as far as Block B on the Moneer Site is concerned, the direction of expansion was unmistakably westwards and northwards radiating from the primary BI corner complex. The built-up area was developed steadily at a constant rate. House units with the characteristic layout pattern described above were built consecutively over an

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

uninterrupted period of construction. This house type was subsequently varied by the addition of further walls during later periods of construction.

The architectural evidence uncovered to date indicates that this block was rebuilt in a single operation. Whether this rebuilding is to be interpreted as signalling a new settlement phase, is a question which must remain to be answered.

ACKNOWLEDGEMENTS

I wish to express my deepest gratitude to Dr. Ishtiaq Khan, Sh. Khurshid Hasan, Ali Mohammad Khan, Jaquin Uddin, Saud Khan Jatoi, Mohammad Awaiz, Hakim Ali Shah Bokhari of Govt. of Pakistan for their generous assistance in executing our work. A special word of thanks to Anna Sarcina, W. von Glisczcynski, Wanzke, Hochscherff and Urban, without whose tireless cooperation, the survey would not have been possible. We are very grateful to the "Deutsche Forschungsgemeinschaft" which has generously financed the research project since its inception. Finally, I wish to thank Dr. Maire Mulloy who translated my draft and put it into shape for publication.

REFERENCES

Fentress, Marcia. 1976. *Resources Access, Exchange Systems and Regional Interaction in the Indus Valley: An Investigation of Archaeological Variability at Harappa and Mohenjo-daro.* Unpublished Ph. D Thesis; University of Pennsylvania.

Jansen, Michael. 1978. City Planning in the Harappa Culture. *AARP* 14; London.

———. 1979a. *Architektur in der Harappa Kultur eine kritische Betrachtung zum umbauten Raum im 3.-2. Jahr - tausend.* Bonn: Habelt - Verlag.

———. 1979b. Architectural Problems of the Harappa Culture. In *South Asian Archaeology 1977.* Naples; 405-432.

———. 1980. Public Spaces in the Urban Settlements of the Harappa Culture. *AARP.* 17; London.

Mackay, E.J.H. 1937. *Further Excavations at Mohenjo-daro.* 2 vols. Delhi.

Marshall, Sir John. 1931. *Mohenjo-daro and the Indus Civilization.* 3 vols. London.

Sarcina, Anna. 1976. La Casa D'Abitazione a Mohenjo-daro. Unpublished Ph.D. Thesis; Torino.

———. 1980. A Statistical Assessment of House Patterns at Mohenjo-daro. *Mesopotamia.* Vol.13-14; 155-199.

Wheeler, Sir Mortimer. 1968. *The Indus Civilization.* Third Edition. Cambridge.

Annual Reports of the Archaeological Survey of India (ARASI) Vol. 1930-34; 1936-37.

1970. Preservation of Mohenjo-daro. Karachi.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

9

R.S. Bisht

Structural Remains and Town-planning of Banawali

Operation Banawali was launched to realize, besides others, two major objectives. First, to build a reasonably acceptable succession of cultures of the third and second millennia B.C. in the middle Sarasvati valley of Rigvedic fame, and secondly, to study the town-planning and architecture of an eastern zone site of the Harappan culture. Banawali, on account of its size and surface collection, held out much promise.

Banawali (29° 37′ 5″ N. : 75° 23′ 6″ E.) stands on the northern bank of the shallow and wide depression of the storm-water drain, known in the locality variously as the Hakra Ban, Ranggoi, Nadi or Nali, but famous as Sarasvati during the Vedic period. The mound is over 400 m square and rises to a height of about 10 m from ground-level. (Bisht 1978).

The first settlers at Banawali occupying the south-western quarter of the entire site **(fig. 9.1)**, were the Sothi people of pre-Harappan (or Kalibangan I) Culture. Notwithstanding the removal of the upper levels from the western half of the settlement, the remaining half exhibits substantial accumulation of the successor culture, the Pre-Indus occupational deposit having a thickness of 3 m and must be more towards the centre of the mound. Obviously, the Sothians lived at Banawali for a longer duration than at Kalibangan. Still, on present showing, our knowledge of the period remains largely limited and fragmentary owing to the small scale of operations. (Bisht and Asthana 1979).

The Harappans followed them closely without any perceptible break. Rather, the coming of the Harappans is heralded more by the apparent changes in the majority of Sothi Ware than by an impressive appearance of the Indus items in the beginning itself. So much so one house, at this juncture, reveals the simultaneous use of bricks of both periods — a feature, not observed thereafter at Banawali or for that matter anywhere else. Still, it is premature to conceive of a cultural transformation in the strict archaeological sense. It might be a phenomenon of mutual adjustment and adoption at the initial stages. After all, certain pre-Harappan ceramic traditions continued throughout Period II. However, the Harappans did not take too long to establish their township at Banawali. The location, size and rigid planning of the town on one hand and the presence in large numbers of antiquities like seals, weights, beads of gold and lapis lazuli and items of marine shells, semi-precious stones, etc. on the other are definite pointers towards the strategic importance of the site. In addition, the appearance, from the mid-levels upwards, of a Bara-type pottery, in addition to another alien ware, is archaeologically significant. These wares possibly came from north-east Punjab and central Rajasthan, respectively.

Period III which we call 'Banawali-Bara', is represented by a class of pottery we get at Bara, Sanghol, Daulatpur, Chandigarh, Bhagawanpura and Dadheri, all located in north-east Punjab and upper Haryana. At Banawali, it makes its very limited appearance in the late phase of the Harappa culture; its heyday lies in post-Harappan times. At Banawali, significantly enough, its settlement lies in the eastern quarter, outside the walled town of the Harappans. On

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the main mound, its pottery is found only in pits and kilns dug into the Indus deposit. Our present knowledge of this period is fragmentary due to restricted digs.

The Pre-Harappan Settlement Planning And Architecture

The first settlement, that of the Sothi or Kalibangan culture at Banawali took place on natural soil. Unfortunately, the restricted area of operation in these levels limits the study of town-planning and architecture of this period. The orientation of house-walls, which have been partially laid bare at several places in the settlement, follows almost the cardinal directions. Further, the same practice appears to have been adopted through successive building phases. It is clear from the fact that, in a vertical dig through a 2.5 m thick deposit, there seldom occurs a structure with different orientation. Thus, the pre-Harappan folk observed set principles in planning their settlement.

As regards the existence of the fortification during this period, so far there is no positive evidence at Banawali. However, there are certain clues worth following. At one point on the north, as a result of stratigraphical coincidence, certainly not of chronological, a pathway (extant width 2 m) with pre-Harappan bricks, arranged on the brick-on-edge pattern, runs along the inner side of the fort-wall of the citadel of the Mature Harappan period. The pathway should have been an adjunct to an important structure which is not visible for the present. Instead, only poor house walls jut from the paved passage on the south. The pathway and the houses rest on a 2.5 m thick deposit of the earlier phases of the pre-Harappan period. On the north the pathway borders on the Indus wall, appearing at the same level.

Significantly, Harappan material is absent beyond this point indicating thereby that the habitation of this period does not extend towards the north. Also significant is that the Harappan strata and structures do not taper off either. Rather, they maintain perfect horizontality up to the point of the pathway, as if there was a strong barrier to contain them and hold up the settlement preventing its extension outside. Such a barrier could well nigh be a defensive wall which or whose ruins might have required the Hrappans to provide a ramp to climb, from the low lying land outside, up the citadel which is perched on the accumulated debris of the pre-Harappan period. After all, we cannot surmise a ring road round the open settlement of the pre-Harappans. It is presumed that the remnants of the pre-Harappan defences may still be found underneath the Harappan wall(s).

Such evidence, nearer home has also been noticed earlier at Kalibangan (*IAR 1962-63: 27*). Further, the Harappan citadel appears to delimit the settlement of the antecedent period, at least on the north, north-east and south. It possibly does so on the west as well if not perhaps on the east. This possibly explains the peculiar nature of the Harappan citadel-wall which, on the north-east, and partly on the north too, takes a long curved turn at the cost of rendering their town- 57
planning asymetrical in an otherwise symmetrical framework. Not only had they gainfully utilized the available elevated gound for establishing the 'citadel', but also, possibly, found it economical to raise their inner defences of the citadel over the existing ones belonging to the previous period. This is not without parallel; Kot-Diji and Kalibangan do have pre-Harappan fortification walls round their settlements.

Because of the limited area of excavations we know very little about the plan and architecture of individual houses. The little definite information that is gathered shows that private houses were usually large and spacious. Mostly, the house-walls are only one brick thick. As such the houses appear to have been low; a single storey with a light thatch roofing, perhaps. Of course, there are examples employing one-and-half, two, or seven more bricks for obtaining thicker walls but they are only a few. Save a solitary wall of burnt bricks, others were of mud-bricks; it is found destroyed by a pit. Besides these houses and house-walls, an enormously thick wall is exposed in the upper levels. Its precise use and nature remains indeterminate.

A series of large rooms has been partially laid bare. The floors are either mud-brick paved or made up of rammed earth/a thick paste of clay. In all cases, these are carefully plastered over. Some of the rooms contain circular pits, possibly grain bins,large and small, as also, deep and shallow. A few contiguous rooms have several hearths, ovens and fire-pits. In more than one example, considerable portions of floors are found turned red, apparently due to excessive use of fire in the house. Pieces of copper and copper slags have 59

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

been collected from here. Probably, we have encountered here a workshop-cum-residence of a metalsmith(s).

The brick, both fired and sun-dried, is the principal building material. These were moulded neatly into standardized sizes; of 13 × 26 × 39 cm, 12 × 24 × 36 cm and 10 × 20 × 30 cm, of the well-known ratio. Another size is cm 24 × 24 × indeterminate thickness. Bricks of different measurements, which could not be ascertained owing to their poor state of preservation, are also used in construction, but in small numbers. Clay is always used as mortar.

Evidence of perishable materials, such as wood, reed and grass have not been found so far.

Harappan Town-Planning and Architecture

Banawali has one more fortified town **(fig. 9.2)** of the Harappans. Although the general principles of Indus planning, as observed elsewhere, were followed here also, yet there were some significant departures from the established norms. It therefore belies the general conception of a chess-board or gridiron pattern of planning, in the strict sense of the term. Here the roads are neither always straight nor do they necessarily cut each other at right angles. The residential sectors or house-blocks conform to the orientation of the nearby roads, hence they tend to lose their cubism. Systematic drainage is the exception than the rule. The fortifications, at times, forsake the dictates of conventional planning in order to suit prevailing local conditions. Lastly, the general subdivision of a metropolitan or urban township into two distinctly separate walled establishment, i.e. the twin-mound site, does not hold good at Banawali. Still, the available evidence proves that there is a basic uniformity in the planning of most Harappan townships, including Banawali, irrespective of their spatial dimensions.

The Banawali mound was spanned by two cross-wise trenches with a view to obtaining the expanse of the settlements of each period as well as the lay-out of the Indus town. The emergent picture is that of a fortified town with an additional citadel inside, thus dividing the whole township, on the present showing, into two parts, i.e. the 'citadel' or 'inner fort' ('acropolis' or 'upper town') and the 'outer town' or 'lower town' (same as 'down town'). Each of the two divisions has enormous defensive walls, duly provided with entry-points, extensive bastions, an acknowledged road system, conforming residential sectors as well as house-blocks, and workable drainage and sanitary arrangements.

The precise shape and size of the settlement is not known at present. The present contours are unreal. However, the maximum length and breadth established so far are 300 m along the north-south axis and 150 m on the east-west axis. These measurements are tentative because the surface spread indicates that the site was still larger, particularly on the west and the north.

Fig. 9.2 will help in understanding in general certain details of the configuration. The township should have had four fortification walls. Of these, so far, only the eastern wall is confirmed, for a length of 100 m. The southern arm is conjecturable. As regards the other two, the surface indications have been recently obliterated beyond cognisance by the farmers who had used bulldozers for making terraced fields for cultivation. Fortunately, the eastern side escaped this rampage.

As stated earlier, the citadel at Banawali is located inside the township. Occupying a vantage location, it naturally appears to be the focal point of the whole scheme. It stands out on an elevated ground commanding over the 'lower town' as well as the surrounding countryside, including the banks of the Sarasvati that flowed past, on the south. The citadel appropriates the entire south-western quarter of the township and makes a deep dent on the south-east as well. At present, it is not certain whether or not it encroached upon the north-western quarter too.

The defensive wall which ranges in width from 5.40 m to 7.50 m segregates the citadel from the rest of the town which, in its turn, on present showing, spreads out on the east as well as the north. It appears that it shares common defences with the outer town, certainly on the south and probably on the west also. The segregating wall starts from south-south-east going up along the same axis over the higher region of the mound for about 125 m and then takes long curved turn from due north to north-west. The total length exposed runs over 235 m from south-south-east to north-west. Two narrow gaps have been found in the exposed portion over this length. One of the two, 1.5 m wide, is located at the north-eastern corner; it is further narrowed by an inbuilt drain of fired bricks with an outstretched *pucca* 57 53

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

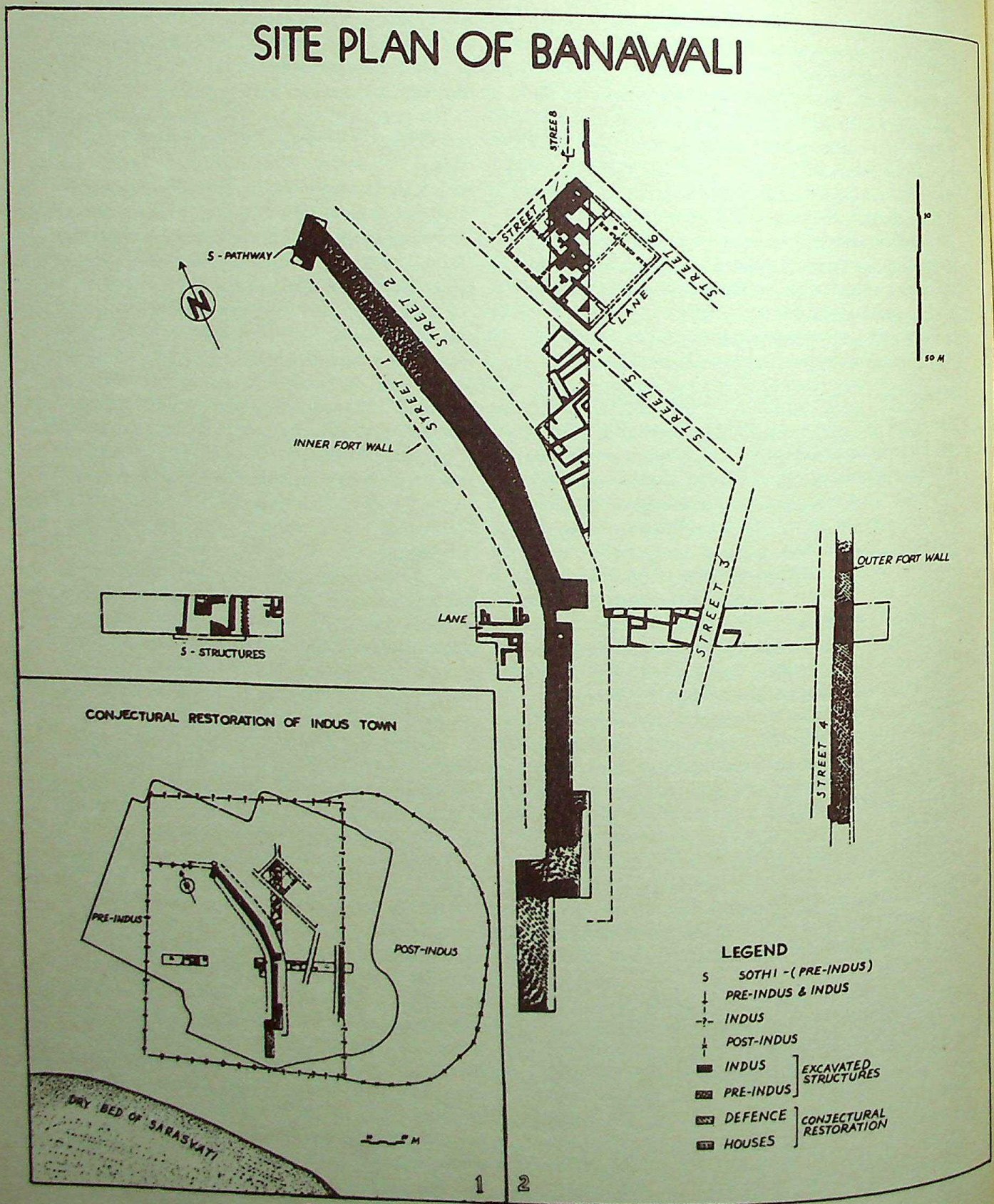


Fig.9.1&2. Banawali: 1. site plan showing areas occupied in different periods 2. Plan of excavated remains.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

apron on the inside of the citadel. Though, found destroyed towards the 'lower town' it does not appear to continue beyond the other edge of the defensive wall, as the excavations reveal. At this
56 point there is an extensive squarish bastion projecting towards the 'lower town'. The other passage, in the form of a *pucca* ramp with an apron, on the side of the 'lower town', is laid bare at the northern end of the exposed length of the citadel wall. The higher level of the citadel necessitated the ramp. Here too, there is some indication of the presence of a bastion which, however, requires further investigation.

So far as the uses of these drain-like passages are concerned, they certainly drained storm-water. But these are not connected to any regular drainage system. In fact, both negotiate the two grand roads which flank the bipartite wall. Besides, one lane in the citadel shoots off from
54 the opposite side of the drain-gap and we presume a similar one on the side of the 'lower town' too. In these circumstances, we believe that these passages were perhaps meant for restricted pedestrian traffic and also for easier and purposeful intercommunication between the two parts of the township. In a similar situation at Kalibangan, we find a flight of steps to cross over the bipartite wall (Lal 1978). We have, therefore, tentatively named these two passages 'drain-gate' and 'ramp-gate', respectively.

Another bastion is provided in the centre of the east arm of the citadel. It too projects towards the 'lower town'. It is still to be seen whether there also exists an entry-point. Further downwards, nearer the southern end, the wall takes a sharp angular and inward turn for a length of a few steps and then again turns to its original direction. The common southern fortification-wall should be quite near. It is yet to be established if there was a regular gateway which necessitated the sharp turn in the wall which was to serve as a bastion.

The northern wall of the citadel does not continue its wavy course for too long; it takes a turn towards the west to join the western arm of the
58 fortification **(fig. 9.2)**. This is clear from the fact that each house-block of the north-trench changes its lay-out to conform to the changing orientation of the citadel wall. But the last structure, a partially exposed house-wall at the northern end of the trench, abruptly changes its direction to become parallel to the town's eastern wall which, in its turn, might turn out to be parallel to its counterpart on the west. This, perhaps, implies that the said structure was independent of the citadel wall. We may, therefore, reasonably conclude that the citadel wall, by then, had straightened itself to join the western fortification wall. This clue, thus, delimits the northward extension of the citadel.

At present, the maximum confirmed dimensions of the citadel are: 215 m along north-south to which can be added another 20 m. On the east-west the length is 75 m plus 7 m of the defensive wall, on the basis of the surface indications, like the spread of pottery, etc. whereas the latter might be, at least, twice as much.

The defensive walls range in width from 7.5 m to 5.40 m with an average width of 6 m. The variation should not lead one to underestimate the oft-claimed standardization in structural activities brought about by the Harappans. In fact, this basal thickness is normally 7 m but it gradually decreases as the wall rises with a taper from both sides. This is done by setting back each course of bricks at the normal rate of 10:5 m, i.e. a reduction of 5 cm after attaining a height of every 10 cm which is the thickness of a brick normally used in the defences. Supposing, a wall with the basal width of 7 m was 5 m high so that a man riding an elephant does not jump across to the other side, the top width would reduce to 4.5 m. However, we can hardly expect to strike the original top in the tropical conditions of India after a lapse of thirty-six centuries or so. Naturally, one is likely to encounter varying widths depending on its state of preservation. Hence the apparent variations in the measurements.

Besides, Harappan defences at Banawali, as elsewhere, have been rebuilt time and again. A cross-section of these would appear like a succession of trapezoids. As far as the wall surface is concerned, it is smoothly plastered with well-kneaded mud, mixed with husk and cowdung. If conjectured by the cubistic standards of the Indus planners and architects, the defensive wall might have been crowned with stepped battlements.

The citadel has, so far, not been subject to adequate probing. Therefore, much of its planning could not be obtained. Nevertheless, it is gathered that the partition wall of the citadel is flanked, throughout by two wide roads—the one running along the inner side, i.e. Street no. 1, is 5.5/5.6 m in width, and the other on the side of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the 'lower town', Street no. 2, is 9.1 m in breadth. These two are joined by the 'drain gate' and 'ramp gate' at two different points. A narrow lane, Lane 1, 1.5 m wide, connects the inner road to the 'drain gate' with house-blocks standing on both sides.

The said houses are laid partially bare. The one on the north appears to be an ordinary house. The other on the south, like the earlier one, is skirted by a lane on one side and by Street-1 on the other. It is of special interest. Although built of sun-dried bricks, it reveals details of the careful architectural design; the bricks were made of specially fine-grained, sticky and deep grey clay; the thickness of walls was unusual — 1.20 m. The roadside corner is provided with a small room-like cubicle with no apparent entrance and, at the same time, too small to live in. Similar cubicles, found elsewhere at Banawali, have been interpreted as concealed storages or vault chambers, as shown in fig. 9.3. But, in the present example, it is tempting to treat it as an inbuilt or concealed bastion to give additional strength to the roadside corner of the structure or to help the walls support another storey; for this cubicle was found well-packed with very hard and compact earth which is normally not found in a vault-chamber. Some of the rooms of this house are paved with bricks. Its location shows that it may have been occupied by an important state functionary. A sounding by the side of this house revealed a Harappan cultural accumulation measuring
52 4.5 m and the house was rebuilt at least four times, whereas the other house in the neighbourhood had an additional building phase, thereby totalling six phases. The top level of the southern house was subjected to large-scale destruction at a later date. However, at no stage was town planning allowed to suffer.

Another dig in the citadel has yielded interesting walls, in the shape of a cross apparently belonging to a house. But certain short and thin walls, with hardly a thickness of 8 cm and height of 16 to 24 cm, radiate from the central point of the cross. One of these thin walls makes a triangle, albeit truncated at the apex, by joining one wall of identical description and one different. Near the apex, there is a square fireplace with an earthern cone standing in the centre. The floor around the fireplace is covered with ash and charcoal pieces. Similar finds occur repeatedly at Kalibangan as well. Are we in a sacrificial chamber?

The 'lower town' was excavated more extensively. It has offered more information about town-planning and architecture. In all, seven roads, called streets 2 to 8, and two lanes, numbered 2 and 3, have been brought to light so far. At least five of the streets are long and deserve to be called thoroughfares. They are found running in different directions, at different angles cutting each other and criss-crossing the whole town, thus belying the myth of gridiron planning.

Street 2 runs along the citadel wall, faithfully monitoring all its curves and turns. It seems to have been so well conceived that the prominently projecting bastions are conveniently accommodated in its sprawling breadth of 9.10 m without having impeded even a two-way vehicular traffic. Street 3, which is 5.5 to 6 m wide, cuts the eastern sector of the 'lower town' obliquely, into two apparently triangular halves. Street-4 (21.90 m wide) runs on the inner side along the outer fortifications on the east. Of streets 5 to 7 (each being 4.20 m in breadth), the first, originating from the central zone of the eastern sector, runs roughly in the north-south direction to go deep into the north-western sector of the lower town. It is so laid out that it should be near parallel to the citadel wall at the closest and that orientation is maintained by the road throughout. As the evidences of the excavations and surface reveal, it cuts Street-3 at an obtuse angle of 120° and, further, Street-7 and Lane-3, at right angles. Street 6 is parallel to Street-5, while Street-7 lies across cutting both streets 5 and 6 at right angles. It perhaps joins the Grand Road, Street-2, further westwards. Street-8, originating from the meeting place of Street 6 and 7, runs northwards, parallel to the eastern fortification wall of the 'lower town' and also perhaps to the western one. It seems, as discussed earlier, to have been free from the compulsions of the partition wall which may have straightened itself out to meet the west wall of the town.

Besides these streets, two lanes in the 'lower town' and one in the citadel have been recognised so far. These lanes, with a constant width of 1.5 m intercommunicate with the two major roads on one hand, and separate one house-block from another on the other. These two features seem to decide the direction of the lanes.

Each individual house or house-block has its

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

own independent identity to the extent of being a principal and sanctimonious unit in the entire framework of the town, as present evidence bears out. Two major roads and two bylanes separate one unit from another. If the flanking roads are parallel, the house-block enclosed by them attains admirably cubic proportions as shown in **fig. 9.3.**

This house is a fine example of perfect planning and architecture. This large house has, however, been partially excavated, and, therefore, other features made out by clearing the surface are shown in dots in fig. 9.3. In dimensions, it is 52 m × 46 m. It has probably as many as eleven units of rooms, big and small, excluding the small cubicles provided in the thickness of the wide wall. The largest space in the house may have been occupied by a courtyard open to the sky.

kitchen with an attached store, a spacious inner apartment and a worship room formed the western part. The last two are apparently in a secluded portion of the house, as far as present evidence suggests. If future excavation reveals a door opening in the inner apartment from the side of one of the adjoining roads, the above contentions may have to be modified to some extent. However, there seems little possibility that the room should have a door opening near a road-crossing. The worship chamber which adjoins it on the north is provided with a platform built against the back wall and with certain curious fireplaces in the front. One square fireplace contains the Kalibangan earthern cone in the centre. The room is found to contain a lot of ash and charcoal. Beside the hearth, there was a water jar placed close by.

Another interesting feature in the house is the

PLAN AND ISOMETRIC VIEW OF A PRIVATE HOUSE IN THE LOWER TOWN

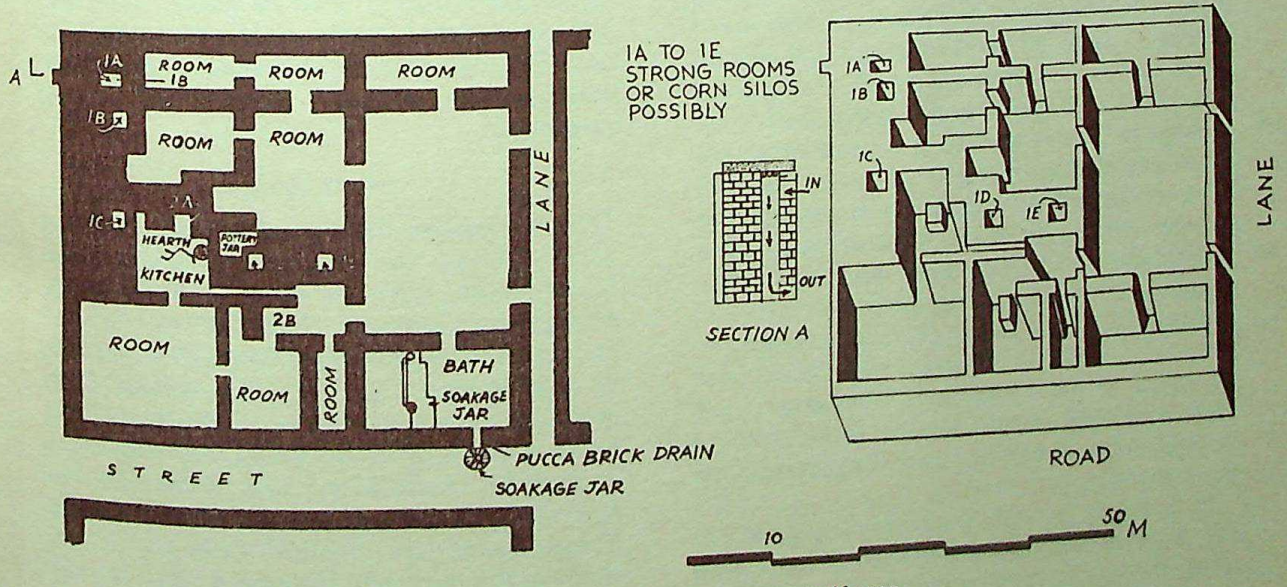


Fig. 9.3 Banawali: Plan of a typical house

Thus the house contained a courtyard, a sitting room, some bedrooms, a toilet, a kitchen and a worship room, besides cubicles, five in all. Minute study of the plan and the conjectural restoration demonstrates that the courtyard is so located that it communicates with the five interconnected apartments which might have been provided with a drawing room, general apartments for living and general stores—all in the eastern portion. Essential service areas like toilet, water-room,

provision of not less than five small cubicles, all located in the enormous thickness of the walls. These cubicles generally measure 1 × 1 m, but in one example it measures 2 × 1 m. There is no apparent approach to them. Most likely, they were blind vaults or storage cells meant for keeping food-grains or valuables. In that case, there should have been one or two openings. One of their probable uses is shown in fig. 9.3.

The considerable thickness of the walls

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

suggests that there were more than one storey. As far as its location is concerned, three major roads and one minor lane surround it from all sides. This seems to be an accepted practice at Banawali in respect of all such residential house-blocks, as even the restricted diggings show On the whole, this house, judged by modern standards even, is a palatial building, particularly in a moderate-sized town like Banawali. However, the other houses too, although only partially laid bare, point to more or less equally grand and elaborate lay-out and architecture.

To cite another monumental example, there is a house near the 'drain-gate'. It too is enclosed on two sides by major roads — one, the grand road on the west along the citadel wall, and second, the central road of the eastern sector on the east, the other two sides being unexcavated as yet. It contains several rooms, probably a courtyard and a corridor, a large room having many earthern jars half embedded in the house floor, a sitting room paved with bricks, a worship room with a fire-place, and a kitchen with several hearths — both on an elevated ground and the ground level — a toilet fitted with a wash-basin emptying its sullage through a *pucca* drain into a soakage jar placed outside, the major street, and a roadside platform constructed against the building complex and just outside the room of the pottery jars mentioned above. Its paved sitting room yielded the well-known 'tiger' seal with a short epigraph. In addition, a few other seals were also recovered from this house or from its neighbourhood. A prominent merchant might have been the owner of this house since it has given a rich harvest of seals, weights, beads, including those of gold, lapis and etched cornelian, besides the *de luxe* pottery of the age.

Surprisingly enough, public sanitary system in the form of 'city drains' is absent. Individuals must have been called upon to take care of the cleanliness by depositing the refuse at fixed points and by draining the sullage water into soakage jars placed in the streets. There may have been scavangers engaged by the municipal authorities or by the people privately or collectively to remove the garbage out of the town.

Houses are made of sun-dried bricks, neatly moulded and joined with mud mortar. Normally, the 'English Bond' style is followed in laying the courses. The walls are normally two-to-three brick wide, although, in certain cases, these are considerably thicker. The latter category was perhaps meant for houses with more than one storey. The walls near the ground level are sometimes found augmented by way of vertical bricks or an earthen toe in order to save them from underscoring. When completed, the walls were neatly plastered over with mud, usually mixed with cowdung and husk. Admittedly, further details of vital importance are yet to be collected.

Bricks, both kiln burnt and sun-dried, are carefully moulded into various sizes which, except the wedge-shaped ones, broadly form two classes but always conforming to the ratio of 1 : 2 : 4 as regards thickness, width and length. The smaller bricks, which variously measure 6 × 12 × 26 cm; 6.5 × 13 × 26 cm; 7 × 14 × 28 cm; 7.5 × 15 × 30 cm or 8 × 16 × 32 cm are used in constructing ordinary residential houses. Bricks sized 10 × 20 × 40 cm; 11 × 22 × 44 cm; 12 × 24 × 48 cm; and 12.5 × 25 × 50 cm were used in massive structures, like the defences. The burnt bricks are normally used in drains, walls and bathing platforms where water was constantly in use. Of course, there is evidence of a well, although not exposed, during the present operations.

Conclusion

Thus, the massive defences, the broad roads, the narrow lanes, the independent and palatial house-blocks, workable drainage and sanitary arrangements are some of the features which the Harappan town planning of Banawali shares with its cognate sites, bigger as well as smaller. Such great importance was attached to the roads in the entire scheme of the township that they alone account for nearly 24 per cent of the total area against the 70 per cent occupied by the houses. These figures are obtained from calculations made in the north and the east trenches laid out at Banawali. In general, the measurements, at present, appear to be multiples of seven. So much so, that some of better known areas, the one in between the city wall and the citadel, is 70 m in width. Likewise, the north-south length of the citadel appears to be about 210 m.

Another interesting feature is the location of the citadel which is neither a separate complex outside the town, as we find at Mohenjo-daro, Harappa and Kalibangan, nor a unit of the binocular planning as at Surkotada. It is rather closer to the planning of Lothal where the citadel

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

occupies the south-eastern quarter of the town. Unlike others, the Banawali citadel has no independent defences of its own. But, as elsewhere, at Banawali too, the citadel is located on a high ground with elaborate fortifications.

Another most significant aspect of town planning and architecture is the provision of segregated private houses—a modern feature. Not unlikely, the lower township was populated by the elite and the merchants while the chief administrator occupied the citadel.

As far as the Period III settlement (Post-Harappan) is concerned, nothing is known beyond the fact that the houses, at least in the upper levels, were made of *pišе* walls. They were well-provided with clay bins in the form of pits with plastered walls. It is significant to note that these bins were present in Period I (Pre-Harappan) houses, but not in Period II (Harappan) houses.

REFERENCES

Bisht, R.S. 1978. Banawali: a New Harappan Site in Haryana. *Man & Environment.* Vol. II; 86-88.

Bisht, R.S. and Asthana, Shashi 1979. Banawali and Some Recently Excavated Harappan Sites in India. In *South Asian Archaeology 1977.* M. Taddei ed.; 223-240

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

10

Marcia Fentress

Time and Process at Harappa and Mohenjo-daro

The only early urban civilization in the world which is still discussed in static terms is the Indus.In Meso-America, in Mesopotamia, in China archaeologists have come to grips with fairly sophisticated explanations of the process, causation and change within the duration of the civilization (Sabloff and Lamberg-Karlovsky 1977; Adams 1966 and 1975; Wheatley 1971). Explanations of how and why urbanism first developed in a region, and the growth and interactional directions the civilization took after its initial phases are numerous. Until we can define more clearly two factors — regional cultural variation, and regional chronological inter-relationship — we will not be able to break through the barrier of merely descriptive work as far as the Indus Civilization is concerned.

The current state of knowledge concerning chronological relationships in the Indus Valley, along with the meagre extant causal explanations, can be summarized in a few sentences. Marshall observed the similarity of the Sumerian and Indus cultures and concluded that there was an 'intimate relationship' between the two (Marshall 1931). Gordon Childe (1935) proposed an ethnic connection with the Sumerians. Wheeler suggested that the Kot Dijian and Baluchi village cultures were partially antecedent, and partially overlapping with the provincial expressions which were 'brought sharply into the orbit of Mohenjo-daro'. Also, that the Indus cities sprang into being fully grown, that they were not independent of Mesopotamia, and that the idea of cities came from Mesopotamia (Wheeler 1968). Mughal (1972) for the first time attempted a continuous and connected chronological arrangement for the Indus Civilization. First he defined a pre-Early Harappan stage which is expressed at Kile Gul Muhammad, Anjira and Rana Ghundai in northern Baluchistan and at Amri in Sind. This was followed by the Early Harappan in which there was no cultural break with the previous period, but contacts with Iran and Mesopotamia began. From the Early Harappan there was a continuation of uniform cultural traits into the Mature Harappan, which precludes the idea of a foreign people or colonization of the Indus Valley.

The Problems

The present paper focuses on the problems of stratigraphy and chronology at Harappa and Mohenjo-daro. These two sites are the largest known and the most extensively excavated and reported. In a sense, all Harappan chronological interpretations revolve around the beginning, duration and end of these two major cities. They are representative of the two primary regions of the Central Indus Valley—Sind and Punjab—which are taken as the urban core or heart of the civilization. Other regions to the east namely, Gujarat, Rajasthan, Haryana and eastern Punjab and to the west, viz. northern and southern Baluchistan, represent regional cultural expressions. The variation of material culture in these non-core regions as compared to the centre and among themselves, ranges in wide degrees. The most essential problem facing students of Indus Civilization is : to what degree do these variations represent chronological factors. Can they simply

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

be attributed to provincial differences or, are we seeing style-changes which are time dependent. As a beginning to clarify these questions, I present here a detailed discussion of the evidence for comparative dating between Mohenjo-daro and Harappa. This is followed by an analysis of the problems in the recognition of stratigraphy at the sites.

Relative Dating: Comparative Evidence Between The Sites

Early excavators noted the similarities between the sites of Mohenjo-daro and Harappa and assumed they were contemporary. The later excavation of Harappa inspired Vats to make specific strata and period correlations between the sites (Vats 1940: 9-10). He did this on the basis of similar architectural sequences, and not on the basis of a well-defined ceramic and artefactual sequences. Casal (1969: 179-80) has presented arguments for Harappa developing later but these are based on incomplete and sketchy excavation reports.

It is now clear that several sites show evidence of an early horizon preceding the Mature Harappan phase. It is still not possible to exactly coordinate the lowest levels excavated at Mohenjo-daro with the lowest levels at Harappa. However, one of the most convincing arguments for a chronologically and stylistically similar early horizon, not only for the two large city-sites but for the entire Harappan region, has been offered by M.R. Mughal (1970: 359) on the basis, first, of a synthesis of available published material (Mughal 1970: 147), and then by using material from two excavations and a survey (Mughal 1973: 14; 1974: 112). Mughal has explicitly set out criteria by which the Early Harappan Phase can be recognized. His argument rests mainly on certain ceramic types and their occurrence in contexts at several sites stratigraphically below that of the Mature Harappan Phase. Kot Dijian ware, first defined in the pre-Harappan levels at the site of Kot Diji in Sind, is found in the lowest levels at Harappa, at Kalibangan, at Sarai Khola, at Amri, in the lower levels at Gumla, at Jalilpur, and at several sites in the Zhob-Loralai Districts in Baluchistan. At Mohenjo-daro itself, the Kot Dijian ware has not been found, but Mughal ties the site with the Early Harappan horizon on the basis of certain 'wet wares' found in the earliest occupation levels so far uncovered there (Mackay 1938: 9). These wet wares also are associated with Kot Dijian wares at Damb Sadaat, at Periano Ghundai, and at other sites in the Zhob and Loralai valleys. At Periano Ghundai recent excavations revealed a sequence of four phases below the Mature Harappan levels (Mughal 1972: 140). In Period C (the third above the natural soil), the typical Kot Diji-vessel shape occurs with both wet ware design and the so-called reserve slip design on the body of the vessel. Wet ware also occurs in Period D, but not in Period E, that is, in the Mature Harappan Phase.

The indications of this Early Harappan Phase at Mohenjo-daro are almost non-existent. However, in the lowest levels of Mackay's excavation, a few shards which seem typical, turned up. There were two wet ware shards possibly from a typical Kot Diji globular jar (Mackay 1938: Plate LXVII, 1 and 2), two so-called reserve slip specimens (1938: LXVII, 3 and 4), four 'glazed' shards (1938: LXX, 1-4), two incised shards, one with triangles and another with squares (1938: LXVII, 6 and 26), and one with a unique design (1938:CXII, 8). All these were found at levels under 8.5 m below the surface. In addition, a fragment, unparalleled in Mature levels of a green steatite vessel turned up at 8.43 m below the datum (Mackay 1938: CXLII 45). Although similar carved steatite vessels have a wide range in space and time in Western Asia (Durrani 1964), the one at Mohenjo-daro has a distinctive and rather unique basket-weave pattern which is remarkably similar to fragments found at Kish (Mackay 1932: 356), Susa (Field 1933: 84), Bampur (B.de Cardi 1970: 319, Fig. 44B), and Yahya (Lamberg-Karlovsky 1970: 39, Fig. 21D). At Kish, it was found in Trench C7 at 6 m and originally dated to 2,800 B.C. In a recent re-evaluation of the stratigraphy at Kish (Gibson 1972: 89), these levels were dated generally to the Early Dynastic III—Early Akkadian Period (2600 - 2300 B.C.). At Susa, the find is vaguely dated to Susa D (third millennium); at Bampur it was a surface find; at Yahya to period IV B regarded as equivalent to the Early Dynastic III–Akkadian Period. This small bit of evidence, when considered in its stratigraphic location with the Early Harappan shards mixed with a few Mature Harappan ones in the lower levels at Mohenjo-daro, gives us an indication of the general time range for the lower excavated levels, that is, Early Dynastic III–Early Akkadian (2600

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

to 2300 B.C.). This is not in great disagreement with the Radiocarbon dates from the Indus Valley.

This evidence in the lowest levels at Mohenjo-daro is admittedly meagre for positively identifying the Early Harappan Phase. It is not unreasonable, however, to say that these shards, taken with the totally unique whole pot and the rare incised green steatite fragment, are the latest manifestations of the Early Harappan Phase. They occur mixed with typical Mature Harappan shards. And even though they were found at a depth under 8.5 m below the surface in the deepest part of the excavation, there still remains some 11 m of habitational deposit below that depth. Perhaps Mackay was just beginning to turn up Early Harappan strata. These few shards from Mohenjo-daro and some from below the 'rampart' at Harappa represent data that must be thought about rather than excluded. At Harappa, there is a thin but distinct habitation layer resting on natural soil, and containing thirty odd shards with simple red-purple bands. These are diagnostic of other shards found in Early Harappan stratified contexts at several Indus sites. In addition, the rampart of the Mature Period, which was constructed immediately on top of this thin basal layer contained about 150 of these same shards, presumably turned up in the course of building the rampart.

At Mohenjo-daro one cannot help but wonder if the 8.5 m below the lowest excavated level is the Early Harappan Phase that has been identified by Mughal. If so, the development of this Early Phase at Mohenjo-daro takes a totally different form from that at Harappa, where the Early Phase is represented by only a few very thin strata. Until further evidence is in, it does not seem unreasonable to suggest that the lowest excavated levels at each of the two sites may represent a roughly equivalent time period.

As for the topmost levels at the two sites, there is an architectural guideline which is present at both. The three latest strata or the upper levels at both sites (i.e. roughly from the surface to 1.5 m below) can be distinguished by unmistakable signs of shoddy construction which includes thin walls, sloppy masonry, poor brick-laying, gaping joints, and the lack of brick-bonding. In some places, there is a well-defined 'break' between the intermediate levels and the upper levels. Presumably this is in the form of some sort of weathering deposit, although this has not been made explicit.

Problems In The Recognition Of Stratigraphy

By current excavation standards, the methods followed in the excavation and recording of stratigraphy and small finds at Mohenjo-daro and Harappa were inadequate. This inadequacy has led to the general rejection of any study of chronology or discussion of strata at Mohenjo-daro and Harappa. However, on a closer analysis of the excavation reports, one finds enough data, at least in a relative stratigraphic sense, that can be put to use. The conceptual frame-works which the excavators applied to their stratigraphical interpretations are described below. The basic assumptions used when excavating and, more importantly, those used when explaining the excavations, are made explicit. It will be shown that there are useful aspects of the stratigraphy, at least in terms of relative chronological comparison.

The Mohenjo-daro and the Indus Civilization (Marshall 1931) is the report for the original series of excavations which took place between 1922 and 1927. In a sense, all subsequent excavations refer back to this report as a guide. Under John Marshall's direction, the responsibility for the different areas of the excavation was given to several people. Mackay excavated and recorded the SD and L areas; Dikshit excavated and Mackay recorded the DK area; Hargreaves, the HR area, Section A; Rai Bahadur Daya Ram Sahni, HR area, Section B; Vats, the VS area; and Marshall, the Stupa Mound. Since each excavator had different notions about stratigraphy and recording, the result is that we have differential information for the site as a whole. Each area must be examined separately for an understanding of the excavators' use of the terms 'strata' and 'levels'.

Marshall states that seven strata were found at Mohenjo-daro. He qualifies this extensively. He understood that the seven strata in different areas throughout the site were not necessarily chronologically related. In the same area, continual rebuilding went on, so that clear delineation of strata in heavily built up areas is not always possible. The nature of the architectural growth at Mohenjo-daro was both continuous and conservative. There seems to be few occupation breaks

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

recorded in the strata, and later buildings were constructed by using the walls of the earlier houses as foundations. Rarely do we find house-plans which do not conform for the most part to the layout of the earlier houses immediately below them. Although it is impossible to estimate the number of mud-brick platforms which served as a foundation base for later houses, they are frequently described in the text. These were formed by filling up the spaces between the old walls in the rooms of the old houses with mud-brick. Frequently the baked-brick outer walls crumbled, leaving only the mud-brick platform, on which houses of the later period were built, the walls of which weathered almost to the foundation-level. To complicate matters even more, where older houses were not filled in with mud-brick, the old walls were raised to make new houses and, for the most part, earth-floors were used.

It was not until the later excavation (Mackay 1938), that footings and joints at the juncture of the old and new were recognized and recorded, so that the intermediate and late period *seem* to run together in many cases. In addition, certain older structures were simply used more or less intact in the later period. This can be seen in the use of unbonded thin partition walls which chopped up large rooms within intermediate period houses. Even with today's standards of observation and recording, Mohenjo-daro would be a most difficult site to do justice to in excavation.

It is clear that the stated criteria for determining earlier and later structures can be readily applied to each of the excavated houses. Unfortunately, these are not always made explicit in the text. Sometimes the excavators simply state without further description that this was a Late or Intermediate period house. The present-day reader can assume that this applies to the quality of construction. However, in many cases, the individual excavators were using other criteria, again not explicitly stated, such as the time of construction of the walls of one house as compared to the walls of a contiguous house, presumably based on such things as foundation and door-sill levels and bonded walls. We may conclude that, not only the quality of masonry, but other criteria were being used by various excavators in determining earlier and later constructions. The major stumbling block is the universal use of the terms Intermediate and Late Periods. It is possible that these inter-period designations are not of the same time-period from area to area within the site. However, it is not altogether impossible that the general quality of masonry all over the site was of better quality in the earlier period. It seems very plausible, indeed, that this attribute would follow a time-horizon throughout the site. In most houses, since floors are missing and pavements are infrequent, there is no definite 'time seal' to insure that small finds and pottery were not being mixed from upper to lower levels. It is evident then that, while there is a complex series of problems inherent in the stratigraphy as recorded in Marshall, there are also regularities that can be made use of.

In Mackay's report of later excavations at Mohenjo-daro (Mackay 1938), there is a sense of more careful observation and recording than in the previous reports. However, stratigraphy and chronology remain a problem because of the nature of deposition and habitation. Mackay states the result of this problem very clearly.

> It should be understood that there may have been a certain amount of overlapping of the levels of various phases. We had no undisturbed ground or sterile layers to help us distinguish between the various phases . . . .In a continuous occupation with only comparatively brief desertions of the site in times of flood, the corresponding levels of different parts of the site would not, as far as I can see, have varied to any considerable extent (Mackay 1938: xvi).

The excavator worked out the average levels of the various occupations of the DK Mound as stated below. These were based on averages of the following factors taken over large areas (Mackay 1938: xv).

1. Levels of street-drains which received smaller channels directly from the houses;
2. Door-sills and pavements;
3. Joints and footings on the walls where a newer wall was added on to a late one.

On the basis of these averages, Mackay proposed a series of general period-divisions (Mackay 1938: xiv-xv)

Late (uppermost) Period

Phase Ia: Owing to denudation is very rarely represented in the DK area. Ranges from 0.86 ft. (.26m) above to 3.2ft. (.97m) below datum.

Phase Ib: Door-sills and pavements average 5ft. (1.5m) below datum.

Phase II: Door-sills and pavements average 7ft. (2.13m) below datum.

Phase III: Door-sills and pavements average 9.9 ft.(3m) below datum.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Intermediate Period

Phase I: Door-sills and pavements average 13ft. (4m) below datum.
Phase II: Door-sills and pavements average 15.9ft. (4.8m) below datum (states elsewhere that Intermediate III would be regarded as the last phase of the Early Period).
Phase III: Door-sills and pavements average 20.4ft. (6.2 m) below datum.

Early Period

Phase I: Average level not certain, probably about 24ft. (7.3m) below datum.
Phase II: not ascertained
Phase III: Not ascertained.

Mackay's period-divisions were loosely coordinated with Marshall's. Mackay notes that he would not have preferred his Late III Phase to be placed at the end of the Intermediate Phase because of his further architectural observations, but he kept the divisions out of deference to the ones established by Marshall. These divisions at both excavations were not based on careful observation of natural and cultural strata. Therefore, one house or block is not clearly and definitively interrelated with the next. However, it apears that the excavators did recognize pits and architectural features sufficiently to get a rough feeling for upper and lower levels and their distinctions.

At Harappa, except for a few areas excavated earlier by Daya Ram Sahni, most of the site was dug by M.S. Vats. This makes the task of interpreting the recorded stratigraphy somewhat easier than at Mohenjo-daro, since the principles being followed from area to area throughout the site were, for the most part the product of one mind, and not several. The two areas where extensive excavations took place were the low Mound F near the river and the higher 'citadel' Mound AB. Areas J and G at plain level and Mound D made up the minor excavation areas.

In several areas at Harappa, there are as many as eight strata. Although the bases for distinguishing strata are never clearly spelled out, it is clear that there were some consistent principles involved in the excavator's work:

1. Lower strata (specifically IV) are distinguished by the quality of the brickwork as opposed to shoddy brickworking in strata I to III.
2. The walls of IV in Mound F in the Granary area were raised over a solid substratum of terracotta nodules, potsherds, and ashes, certainly different from the texture of strata I to III.
3. Although the strata are recorded in depth below surface, it is recognized that contemporary foundations need not and, in fact, do not occur at the same depth below the surface.
4. Even though walls overlap and intersect each other, there is recognition of the principles of bonding and the architectural relationships involved in the relative dating of walls.
5. There is recognition of 'intervals' between strata and although there is no specific description of what this means, one must assume that this involves a distinguishable non-habitational deposit of some sort.
6. The walls, which continue upward in the same alignments and locations from great depths, show quite clearly additions and changes which the excavator sometimes relates to the surrounding strata.
7. In some cases, the bases for strata are quite clearly described, e.g., '5ft. of debris separating 2 levels of drains' (Vats 1940: 80).
8. Pits and tunnels are recognized and described separately from strata.
9. Plate XXIb (Vats 1940) is a clear illustration that the excavator understood the broad principles of stratigraphy. It also seems fair to assume from the photograph that more strata existed than were distinguished. There can be no doubt, however, that broad relative chronological distinctions were made.
10. In different trenches (unconnected but in the same area), the strata are sometimes correlated by the quality of brick construction rather than the actual observed number of strata below the surface.

Thus, it is clear that Vats, who was trained at Mohenjo-daro, was following the same principles of excavation and stratigraphical observation that were used by Marshall and Mackay.

Conclusions

Reverting to the questions asked at the beginning of this paper, we see that there are time differences between Mohenjo-daro and Harappa, and there are also areas of overlap. (A stylized stratigraphic schema is shown in **Fig. 10.1**). I have documented elsewhere that there are clear aspects of cultural variation between the sites (Fentress 1976). These inter-site variations manifests themselves in the architecture, city-plan, glyptic objects (commonly called seals, although this is a functionally incorrect term as applied to the whole assemblage), metal vessels and metal figurines, terracotta figurines, burial or post-cremation urns. Some of these variations are time-dependent although most are not (see Schema, and Fentress 1976). Thus, the artefacts which appear early and mostly at Harappa, such as the crude bull terracotta figurines, the miniature amulet-tablets (seals), the post-cremation urns, those which appear in the intermediate

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

levels and only or mostly at Mohenjo-daro; the copper tablets and metal figurines, and those which appear at both sites but in the upper levels; round seals, triangular prism impressions, dotted circle symbols, give us small clues in thinking about development and processual change at the two city sites.

A proposed processual time and development framework adequate for field testing can be outlined as follows. There was a longer formative or Early Harappan period at Mohenjo-daro before 2500 B.C. This period on the Indo-Iranian plateau was a time of growth and long-distance exchange. There were regular contacts between eastern Iran, Afghanistan and the Indus area, continuing until the Mature Phase. By around 2500 B.C., the vigour and regularity of these contacts diminished. In northern Baluchistan and Punjab, several Early Harappan sites come to an end. To the east of the Indus, several sites develop from Early Harappan to Mature Harappan. Further, between Harappa and Mohenjo-daro, there is an increase in similar material culture from 2500 B.C. Trade indications along the Persian Gulf and through southern Baluchistan increase. The northern trade routes close down.

Harappa's quick growth as an urban centre on top of a very short, possibly 'provincial' centre as evidenced by the very thin pre-Harappan layers and the immediately following rampart can be explained from the extant evidence in one way. Resource access and trade mechanisms are involved. That is, Harappa had access to diverse and rich resources within its own hinterland (Fentress 1976 Appendix 1, and Fentress 1978). Mohenjo-daro had to extend its procurement systems well beyond its own region for stone and mineral resources in order to supply the trade demand through the southern routes westward. Our current understanding of the chronology and stratigraphical development and inter-relationship between the two sites supports this view. This hypothesis is probably much more simple than the reality of the cities' growth process. However, the environmental, chronological and archaeological data lead us to suppose that resources and exchange, viewed from regional bases of 'inner and outer access' were instrumental in shaping the growth and interaction of early civilization in the Indus Valley.

REFERENCES

Adams, Robert M. 1966. *The Evolution of Urban Society*. Chicago.

———. 1975. The Emerging Place of Trade in Civilization Studies. In *Ancient Civilization and Trade*. C. C. Lamberg-Karlovsky and J.A. Sabloff ed. University of New Mexico Press. 451-466.

Childe, V. Gordon 1935. *The Aryans*. London.

de Cardi, B. 1970. The Bampur Sequence in the Third Millennium B.C. *Antiquity*. Vol 41; 33-41.

Durrani, F.A. 1964. Stone Vases as Evidence of Connection between Mesopotamia and the Indus Valley. *Ancient Pakistan*. Vol. I; 51-96.

Fentress, Marcia 1976. *Resources, Access, Exchange Systems, and Regional Interaction in the Indus Valley*. Ann Arbor, Michigan: University Microfilms.

Field, H. 1933. Steatite Vases from Kish. *Antiquity*. Vol. 7; 84-85.

Gibson, McCure 1972. *The City and Area of Kish*. Miami.

Lamberg-Karlovsky, C.C. 1970. Excavations at Tepe Yahya 1967-69. *American School of Prehistoric Research Bulletin*. Vol. 27; 1-134.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro*. 2 vols. Delhi.

Marshall, Sir John 1931. *Mohenjo-daro and the Indus Civilization*. 3 vols. London.

Mughal, M.R. 1970. The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan. Unpublished Ph.D. Dissertation. University of Pennsylvania.

———. 1972. A Summary of Excavations and Explorations in Pakistan (1971-72). *Pakistan Archaeology*. No. 8; 113-158.

Mughal, M.R. 1974. New Evidence of the Harappa Culture. *Archaeology*. Vol. 27, 2; 106-113.

Sabloff, J. and Lamberg-Karlovsky, C.C. (eds.) 1975. *Ancient Civilization and Trade*. Albuquerque: New Mexico.

Vats, M.S. 1940. *Excavations at Harappa*. 2 vols. Calcutta.

Wheatley, Paul 1971. *Pivot of the Four Quarters*. Chicago.

Wheeler, R.E.M. 1968. *The Indus Civilization*. 3rd ed. Cambridge.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

11

B.M. Pande

Harappan Art: An Experiment in Third Dimension

The Harappan seals, in intaglio, are considered important because of the inscriptions contained in them. These seals, made mostly but not always of steatite also bear animal (in some cases chimeras, human and/or composite animal) figures in intaglio some of which are engraved with fine and exquisite details. Among the animals the most frequently represented is the unicorn; the other common figures are those of the humped bull, rhinoceros, tiger and elephant. Besides, the seals also contain figures of the buffalo, short-horned bull, horned elephant, goat- and ox-antelope with either long or short tail, etc. The terracotta seal impressions or sealings bearing the positive impressions of seals bring out the animal figures in relief.

While the inscriptions on Harappan seals and sealings have been subject to detailed analysis and interpretation, the animal figures have only been summarily studied and that too to see if the animals depicted were the denizens of the period and area of the Harappan culture and sometimes, in passing, the quality of their depiction. In Piggott's (1950: 183-84) view:

> The engraved seals . . . have, however, other claims to attract our attention . . . . The scenes depicted upon them usually consist of representations of animals shown in profile, and frequently carved with a sureness of touch; some animals are mythical inventions such as chimeras and unicorns but others, notably the magnificent series of humped and dewlapped bulls, monumental for all their miniature size, are beasts immediately recognizable as likely to be familiar, wild or tame, to the Harappa artists.

It is obvious that the seal-cutter was, in a great majority of cases, successful in depicting the animal forms most skilfully and the details come out brilliantly in relief in the seal impressions.

With a view to seeing how these animals would have looked in the round, the author got made in 1974, some of the animal figures on Harappan seals in plaster of Paris by D.K. Malik, Modeller in the Excavations Branch of the Archaeological Survey of India. For this purpose, five of the largest-sized seals were selected at random, each containing the figure of the humped or Brahmani bull, rhinoceros, tiger, elephant and the unicorn. The idea was also to see if, and how well, they compare with the figures of those animals which are available in terracotta, faience, bronze, steatite, etc.

The process adopted for making the figures is described by Malik in the following words :

> All the figurines are made in plaster of Paris and are not eye copies. These have been made by combining the process of modelling and chiselling, keeping in mind the authenticity of the form, the original proportions and measurements of the figure.
>
> First a cast was made in plaster of Paris of the original seal containing the figure of the animal in negative; from this cast, unwanted portions beyond the outline of the figures were chiselled out and one side of the figure was obtained. Thereafter, a one-sided pressed mould in plastic clay was prepared from this cut-out figurine.
>
> From this mould, a cast was made leaving the excess plaster in a roughly-modelled rounded form of the figurine above the moulded surface. When cured, the cast was released from the mould and the total finishing was rendered by carving with sharp-edged fine chisels maintaining the proportions and measurements of the original side. Three chisels—with a 7 cm wide obliquely-cut edge — a 2 cm wide parallel edge; and a round, pointed edge—were used in carving the figures.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

The figures as prepared by Malik show a remarkable difference in execution and finish in comparison with the animal figurines found at Harappan sites. Even though they are miniature-sized and contain only the profile of the animals, these figures show superior craftsmanship and a remarkable depiction of details and understanding of the anatomy of the animals. The figures of the Brahmani bull, the unicorn, the elephant, the rhinoceros and the tiger, as prepared by Malik from the seals, despite the fact that 'their conventional attitudes provide little scope for the expression of monument' (Mackay 1976: 126) show much care lavished in their modelling by the Harappan seal-engravers. In the figures of the bull 'its pronounced muscularity and dignified stance inspired the stone-cutter to his most masterly efforts' (Wheeler 1960: 83). Despite the fact that the seal-cutter had obvious limitations due to the size of the seals, he was able to render the animal in such a manner that:

> 'the muscles ripple under the skin in a most realistic fashion, and the well-nourished hump drooping at the back is also extremely well engraved, especially when it is remembered that all the work had to be done on so small a scale.' (Mackay 1976: 126-27).

Such mastery in the execution of the bull figurines is rarely seen save in some terracotta bull figurines like the one from Mohenjo-daro (Marshall 1931: pl. XCVII, 23; Mackay: 1938, pl. LXXIX, 30, 20 (in bronze); Wheeler 1960: pl. XX) and Kalibangan (*IAR 1961-62*, pl. LXXB).

The representation of the rhinoceros figure varies in quality in the Harappan seals. In seal no.342 from Mohenjo-daro (Marshall 1931: pl. CXI) the wrinkles and folds of skin of the animal are very true to life as can be seen in the model prepared by Malik. Rough excrescences on the skin are indicated in some of the examples by means of holes made with a fine drill. In others, hatched lines are employed. The Harappan seal-cutter was able to render the angry, beady eye and hide of the one-horned rhinoceros with an observation and actuality 'that reminds us of its physical survival in the Himalayan foothills at least until the sixteenth century A.D.' (Wheeler 1960: 83-84). However, the rhinoceros figure in the seals, unlike the other animal figures, seems to have parallels. In the National Museum, New Delhi, is displayed a steatite rhinoceros figure from Harappa which is quite akin in rendering to the rhinoceros figure on Harappan seals. In this context, attention may also be drawn to a little figure in burnt steatite of a sitting rhinoceros from Harappa which is an excellent example 'executed with great fidelity, the prominent snout, short horns and rough hide being well brought out' (Vats 1940: 307, pl. LXXIX, 74). In contrast, Vats considered the other rhinoceros figures in terra-cotta, as toys or the handiwork of children.

The model prepared in the round from a broken seal from Mohenjo-daro (Mackay 1938: 330, pl. LXXXVII, No. 259) with only the head and shoulders of a tiger intact brings out clearly the fact that it is 'a splendid piece of work, the open mouth, tongue, bared fangs, and placing of the double stripes being indicated with great fidelity' (Mackay 1976: 127). It is undoubtedly 'one of the most realistic representations of the tiger.... The broad stripes of the body are cleverly suggested by double wavy lines which are broken at intervals to avoid monotony' (Mackay 1938: 330). Even the loose folds of skin round the animal's neck have been shown in a realistic manner. The other figures of the tiger found from Harappa or Mohenjo-daro compare very poorly with the tiger depicted in this fragmentary seal.

The elephant figures rank next in order of popularity to the bull. These are carefully portrayed and, in some cases, even to the wrinkles along its back. Careful attention was paid by the seal-engravers to the rugous folds of the trunk and the forelegs are cut very carefully and so are not wooden in appearance. In some of the seals great attention was paid to the representation of bristles along the outline of the body and head of the animal, perhaps to indicate that these representations are of a younger animal, for adults generally lose this hair (Mackay 1938: 329).

The most common figure, as already stated above, is that of the unicorn which Mackay (1938: 326) calls the 'Urus bull'. He has rightly assumed that owing to the difficulty of drawing in perspective, one horn is supposed to be behind the other (Mackay, in Marshall 1931: 382; and in Mackay 1938: 326); in the two instances of the same animal with two horns (Mackay 1938: pl. LXXXVII, Nos. 234 and 359) the shape of the horns differs from the usual depiction of horns of the animal as in other seals. Wheeler (1960: 83) also supposed that 'two horns are in fact intended, one behind the other'. In the figure prepared by Malik from a seal the seal-engraver

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

perhaps had in mind two horns and not one since in the model the thickness of the horn seems to oe unusual.

In the repertory of animal figurines from Harappan sites, the modelling is generally rough and summary except a few of the bulls which, however, reach a high level of excellence (Wheeler 1960: 74). While describing the terra-cotta animal figurines from Mohenjo-daro, Mackay (in Marshall 1931: 346) considered them mainly toys for children which judging by the roughness of their workmanship were frequently the handiwork of children themselves. Similarly, the animal figures at Harappa show a greater variety and have also been considered by Vats (1940: 300-301) to be pottery toys.

The most skilful models of animals are the tiny figures of sheep, dogs, squirrels and monkeys made of faience 'which at their best and within obvious limitations are little masterpieces of craftsmanship' (Wheeler 1960:75). The tiny faience monkey from Mohenjo-daro (Marshall 1931:351-52, pl. XCVI, No.13), is 'a veritable masterpiece of observation and artistry' (During-Caspers 1977). The same could be said about the artistic rendering of animal forms in the intaglio-seals of the Harappans which represent an aesthetic capacity more broadly based than the recovered examples of it alone would indicate (Wheeler 1960:69). Such mastery in rendering is seen in 'bronze images of animals, a subject in which the Indus modeller was at his best' (Wheeler 1960:72).

REFERENCES

During Caspers, Elizabeth C.L. 1977. Caricatures, Grotesques and Glamour in Indus Valley Art. In *South Asian Archaeology: 1977* Naples. 345-75. M. Taddei ed.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro*. Two volumes. Delhi.

———. 1976. *Early Indus Civilization*. Revised and enlarged edition by Dorothy: New Delhi.

Marshall, Sir John. 1931. *Mohenjo-daro and the Indus Civilization*. 3 vol. London.

Piggott, Stuart. 1950. *Prehistoric India*. Hammondsworth: Pelican.

Vats, Madho Sarup. 1940. *Excavations at Harappa*. 2 volumes. Delhi.

Wheeler, Sir Mortimer 1960. *The Indus Civilization. The Cambridge History of India*. Cambridge University press.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

12

George F. Dales

Sex and Stone at Mohenjo-daro

The discovery of certain enigmatic objects at Mohenjo-daro during John Marshall's excavation evoked speculations that persist till today concerning sexual beliefs and practices in the ancient Indus (Harappan) civilization. Some of the artefacts have been described as phallus-like and the surmise was made that phallic worship was practised, and provided the prototype for the phallic *(lingam)* aspect of Shiva as known in later Hinduism. Other circular stone objects suggested representations of the female generative organ *(yoni)* and hence worship of the Mother Goddess principle. Happily, the majority of present-day scholars have recognized the paucity and ambiguousness of the evidence for either identification and in general have refrained from making overenthusiastic claims concerning the sexual beliefs of the ancient Harappans. Mortimer Wheeler's brief comment in his Indus Civilization is typical of this restraint: Phallic worship, he says, is:

> A non-Aryan tradition which appears to have obtained amongst the Harappans *if* certain polished stones, mostly small but up to two feet or more in height, have been correctly identified with the linga and other pierced stones with the yoni. (Wheeler 1968: 109).

The emphasis on *if* is mine but it was apparently basic to Wheeler's thinking as well because he does not mention the matter again in this or his other books. Unfortunately, not all writers are so cautious and the attribution of phallic worship to the ancient Indus folk persists in much of the popular literature. This notion is perpetuated even more dramatically in museum displays that artificially place the so-called phallic stones in close association with the stone rings.

A brief survey of the actual archaeological evidence and of the comments of the various excavators, should help to clarify some of the confusion resulting from the inconsistencies in the original publications.

Pre-eminent in the literature is John Marshall's publication of his excavations at Mohenjo-daro, especially his Chapter V: Religion. One is immediately impressed in reading this chapter with the interpretative difficulties faced by the early excavators at Mohenjo-daro and Harappa. Confronted with the *disjecta membra* of a totally unexpected and mute ancient civilization, it was necessary to initially rely heavily on analogies and comparisons with other better known cultures. Marshall at times made excessive use of comparisons—by present day standards — with the Mediterranean Classical cultures, ancient Mesopotamia, and historical India. Nonetheless, he also warned his readers against making unwarranted assumptions. In discussing the elongated stone artefacts, he says, 'it is necessary to guard against the mistake of seeing a phallic meaning in sacred stones where none in reality exists' (Marshall 1931: 58). And in discussing the ring-stones he says,

> we must not, of course, infer that each and every holed stone found on this site was of the same character. That would obviously be absurd . . . . We are concerned only with those ring-stones for which no utilitarian purpose can be suggested . . . (Marshall 1931: 63).

Marshall classified these enigmatic objects into three groups:

1. Lingas

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

2. Baetylic Stones
3. Ring Stones

LINGAS

A disparate collection of objects is included in this group ranging from tiny conical stone pieces (Marshall 1931: pls. XIII, 3; CLV, 11-25; **fig. 12.1/1,** a-c) that may well have been gamesmen, to three different shaped objects illustrated on his pl.XIV, 2,4 and 5 **(fig. 12.1/2, 3, and 4).** Of these, Marshall's number 4 is very convincingly phallic-shaped and number 2 may be possible. Marshall (1931: 59) states that both numbers 2 and 4 are 'unquestionably phalli, more or less realistically modelled, and prove conclusively that phallism in India had a pre-Aryan origin'. The difficulty in accepting this bold assertion is that, apart from a general mention that these objects belong to the Indus Civilization, no information is published concerning where they were found. They are not included in the chapters describing the excavated finds nor is any mention made of them in Mackay's report on his subsequent excavations at Mohenjo-daro.

Vats's report on the Harappa excavations is also silent concerning them, except for a general statement that he concurs with Marhshall's interpretation of some of the Mohenjo-daro stones as *lingas.*

To bolster his conclusion that phallic worship was widely practised in pre-Aryan India, Marshall makes a direct comparison between his Mohenjo-daro stones and a single fragmentary piece discovered by Aurel Stein at Mughal Ghundai in northern Baluchistan (Marshall 1931: pl. XIII,1: fig. 12.1/5). In appearance, this resembles the top of what may otherwise be regarded as a gamesman at many Indus sites, and is, at any rate, not certainly a phallic representation. Equally implausible is Marshall's (1931: pl.XIII,7: **fig. 12.1/6**)citing of the peculiar clay figurine fragment discovered by Stein at Periano

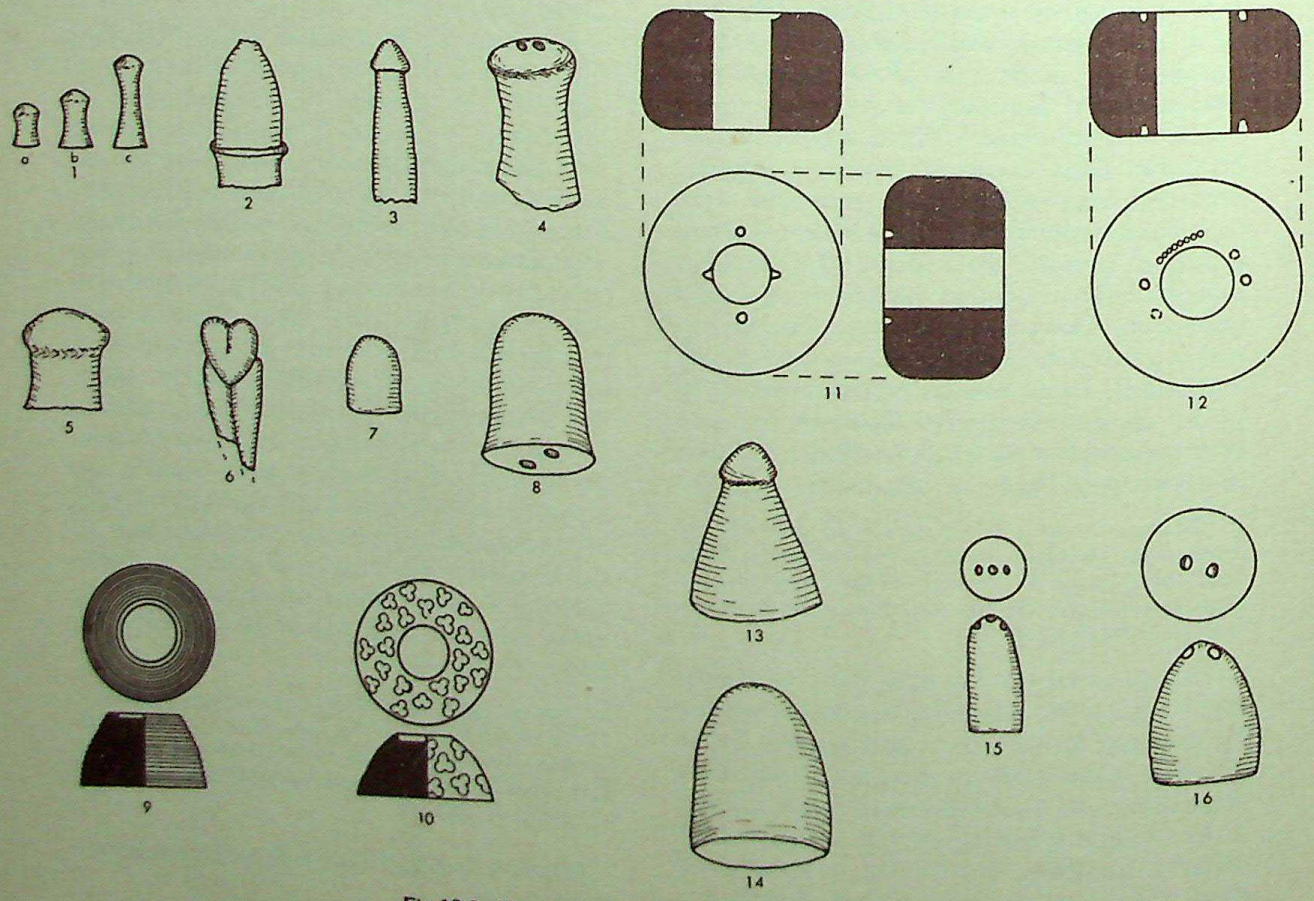


Fig.12.1. Harappan stone objects usually identified in terms of sex-worship symbols

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Ghundai. Whatever it may have represented in antiquity, it stretches the imagination beyond credibility to interpret this as depicting the *yoni* or female genitals.

Marshall, while then conceding that the smallest objects may have served as gamesmen, states that the larger objects are 'much too heavy for that purpose, and their shape does not suit them for use as weights . . . . Indeed,' he continues,

> The only explanation applicable to them all is that they were sacred objects of some sort, the larger ones serving as aniconic amalgamate for cult purposes, the smaller as amulets to be carried on the person, just as miniature lingas are commonly carried by Shaivites today (Marshall 1931: 59).

Baetylic Stones

Marshall distinguishes between this group of conical, round-topped stones and phallic stones. A baetyl is, by Webster's definition, 'a roughly shaped stone held sacred or worshipped as of divine origin'. The Mohenjo-daro examples cited by Marshall are hemispherical or conical in shape ranging in height from a few inches to three feet. He illustrates only five examples [Marshall 1931: pls.XIII, 4 **(fig. 12.1/7)** 5, and 6; XIV, 3; **(fig. 12.1/8)**, and 7], and gives no details as to their provenance.

Noting their general resemblance in shape to *lingas* found in Shiva temples today, he warns,

> We must not, however, allow this resemblance to mislead us. They may be phallic in character. There is nothing to prove that they are not. But prima facie it is unlikely that the phallic emblem would have been conventionalized in two different forms in the Indus Valley . . . (Marshall 1931: 60).

He sees a possible connection with Palestinian *masseboth*, sacred stones of the Canaanites which had no sexual connotation (Marshall 1931: 61). The two holes in the base of Number 3, pl. XIV, and several other examples, suggested to Marshall that such objects were affixed to bases. It is highly suggestive, from form alone, that such bases, if they in fact were that, are represented by hemispherical stone objects such as illustrated in Mackay's report (1938: pl. CIV, 22 and 26; **fig. 12.1/9 and 10**). None of the illustrated 'bases' are large enough to accommodate any of the published 'baetylic' stones, and none were found in direct physical association. Archaeologically this raises a serious problem of interpretation.

Ring Stones

Marshall's discussion of these curious doughnut-like stone objects, some with undulating upper and lower surfaces (Marshall 1931: pls. XIII, 9 & 10; XIV, 6 & 8) and others with plain flattened upper and lower surfaces, is quite unsatisfactory. Illustrations are poor, or lacking, and not adequately identified. For example, the undulating stone rings in Plate XIV are from Harappa. Marshall states, with no documentation, that stone rings are found in 'large numbers' at both Mohenjo-daro and Harappa. Even a casual reading of the excavation reports will make one question the validity of this quantification. But there is a wide size-range involved, from half-an-inch to almost four feet in diameter. Henry Cousens, the renowned expert on Indian architecture and antiquities, suggested to Marshall that the large ring stones were 'threaded on poles to form columns, (Marshall 1931: 61) but Marshall rejected the suggestion because it did not apply practically to the miniature examples. What Marshall failed to take into account here is that the manufacture of fine quality miniatures is common at Harappan sites. To disqualify an explanation for the full-scale objects because the miniatures could not have served the same physical function is unwarranted. Marshall reverted — and I use the term advisedly and regrettably — to a religious explanation:

> All things considered, a more reasonable and adequate explanation of these ring stones is to be found in the magical properties which holed and ring-stones have from time immemorial been supposed to possess and in the universal awe in which they are held in India, whether as fetishes or as actually imbued with a divine spirit. (Marshall 1931: 62).

Then, in a classic example of 'leapfrog' archaeological logic (Tringham 1978) he states that:

> We have already seen that the presence of phallism at Mohenjo-daro is proved by the discovery of realistic *lingas*, as to the character of which there is no question; and that in the neighbouring country of Baluchistan the worship of the *yoni* is similarly attested at Periano-Ghundai. We are justified, therefore, in supposing that the ring-stones found at Mohenjo-daro may have had the same cultural, fetish or magical significance that the ring-stones of a later date had (referring to a few large circular, centre-holed stones found in historical contexts at Taxila and other sites. (Marshall 1931: 63).

He continues that 'we cannot yet prove that they possessed it, but the hypothesis is reasonable, and it is the only one yet advanced that adequately explains these curious objects.'

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Marshall's concluding statement in this matter is that:

> we must not, of course, infer that each and every holed stone found on this site was of the same character. That would obviously be absurd. We are concerned only with those ring-stones for which no utilitarian purpose can be suggested . . . (Marshall 1931: 63).

Unfortunately, the reader is left with no clear-cut criteria for interpreting the artefacts.

It is a fact, often overlooked, that Marshall's three-volume report on Mohenjo-daro is a compilation of reports from his individual field-supervisors. Several of the main chapters in the Marshall volumes are authored by his field assistants whose manuscripts are published, apparently unedited, but with critical footnotes added by Marshall. Among these was, most prominently, Ernest Mackay who subsequently took charge of the excavations. One can readily sense the personal tensions involved in all this — something not uncommon in archaeological projects—but it is unfortunate that, in this instance, they interfered with the quality and consistency of the final published report.

In Chapter XXIV, Mackay describes, in more detail than Marshall, the stone-rings. First, he refers to the discovery of three complete and one partially preserved stone-rings placed in a neat row in Chamber 74, Block 3, Section D of L Area on the Citadel Mound (pl. XXXVIII, f). A brief discussion of them is found in Chapter XI, also by Mackay. He notes the peculiar architectural features of this room and the surrounding area (Mackay 1938: 174), characterized by two rows of brick piers. To the west of these piers was found the neat line of stone-rings. These are made of cherty limestone, and the workmanship is described as 'somewhat rough'. These are all of the simple 'doughnut' type, with flattened upper and lower surfaces. The three well-preserved examples are notably consistent in measurement. Taking them in their alignment from west to east, they measure as follows:

	#L-1016	#L-1013	#L-1012
Diameter	1 ft. 6 in. (46 cm)	1 ft. 7 in. (48 cm)	1 ft. 7 in. (48 cm)
Height	9 in. (24 cm)	1 ft. (30 cm)	1 ft. (30 cm)
Hole Diameter	6 in. (15 cm)	6 in. (15 cm)	5¼ in. (13 cm)

This particular part of the so-called citadel is intriguing because of the enigmatic architectural features and the presence of stone sculpture and other relatively rare features. It is a pity that it was found in such a denuded condition and that the likelihood of further explanatory discoveries is virtually nil.

The discovery of a cache of seventeen or eighteen large doughnut-shaped ring-stones in Room 49, House 5, Block 2, Section B of the HR Area at Mohenjo-daro, is described in different parts of Marshall's report. First, H. Hargreaves (Marshall 1931: 191) describes the room and the actual discovery of the stone-rings by the Indian archaeologist Rai Bahadur Daya Ram Sahni (Mackay 1948: 29).

Hargreaves describes the find-spot as within the confines of a peculiar long-narrow room with square beam-holes in the upper walls indicating roof-beams. But this room had been almost completely filled in after its initial period of use to the point where a brick paving was laid at a depth of about 18 inches (45 cm) below the level of the original roof-beam holes. On this paving were found the eighteen stone rings along the north wall. He describes the rings as being 9 to 10 inches (23-25 cm); high with central holes ranging from 4½ to 9 inches (11 to 23 cm) in diameter, 'drilled in some cases from both sides. Some of them have shallow holes neatly drilled on either side of the central perforation, while others have in the same positions long rectangular grooves. possibly for metal clamps. A few are also drilled with lines of small cup-marks' (Marshall 1931: 191; **fig. 12.1/11 & 12**). Not far from these rings were found two round stone 'caps' (CXXX, 21 & 23) which he regards as phallic. The stone rings represented *yonis* to both Hargreaves and Sahni.

Mackay's original study of the stone rings published in the Marshall report states that the presence of dowel holes and slots on the upper and/or lower surface of the stones suggests that it was intended to fasten the stones 'to something that was passed through their central apertures' (Marshall 1931: 473). A dowel, perhaps of metal, might have been passed at right angles through a wooden or stone central pole so that its ends engaged the slots in the ring to prevent the stone from sliding or rotating. Because he was unable to study all the stones in detail at this point (they were being soaked for a year to remove salts), his initial interpretation differs somewhat from his more detailed discussion in his own subsequent volume (Mackay 1938). For example, in the Marshall report, he states that because 'these

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

stone-rings were found in a heap and vary in size as well as in the bore of the central hole, it seems evident that they do not belong to one another, but had been gathered together for some unknown purpose' (Marshall 1931: 473). And again,

> There is no doubt that being of different sizes the stone rings that were thus found together in the HR Section had been collected for some other than their original purpose. Many were badly broken and weathered before they were gathered together, which suggests that it was not intended to apply them again to their original purpose. (Marshall 1931: 474).

He concludes, however, that they 'served some architectural purpose.' Marshall inserts a footnote at this point:

> The inference here drawn by Mr. Mackay seems questionable. The room where the ring-stones were found may have belonged to a temple, and they may have been deposited there as cult objects. (Marshall 1931:474).

As for the second type of stone rings, with the undulating upper and lower surfaces, Mackay, writing in the Marshall report, mentions only five having been found at Mohenjo-daro (CLVI, 2-5; CLVII, 56 & 57) all of which are very small (1.05 to 2.5 inches or 2.6 to 6.3 cm in diameter). He comments that these miniatures and the large examples found at Harappa 'seem to be allied to the large stone rings . . . in fact, they only differ from them in the wavy-like surface of the top and base' (Marshall 1931: 474).

Mackay, in the same Marshall report, describes another type of curious limestone object that is not mentioned by other writers. These are 'conical stones with heads' (Marshall 1931; pl.CXXX, 27 **[fig. 12.1/13]**, 29 & 33). They are quite large, having a base-diameter of from 8.3 to 9.2 inches (21 to 23 cm) and height of from 10.5 to 13 inches (26.6 to 33 cm). They were apparently found at different places in the site—two in the SD Area of the 'citadel' and one in the VS Area of the 'lower town'. Mackay states:

> In many respects these stones resemble the phallic object (*linga*) of the Hindus. The fact that nearly all of them are more or less polished at the top suggests that they were constantly fingered; possibly they were repeatedly anointed with butter as is the custom at the present day. (Marshall 1931:476).

Mackay's own excavations at Mohenjo-daro (1938) subsequent to Marshall's added little substantive information as to the purpose of all these stone objects. Seven stones and two large pottery cones of varying sizes were unearthed from different locations in the DK Area. Two of these (pl. CIV. 27 **[fig. 12.1/14]** & 29) he thinks are certainly 'phallic emblems', and he refers the reader to Marshall's discussion in *Mohenjo-daro and the Indus Civilization* (1931). But lower on the same page he comments that number 27, and some of the others, are not *linga* because 'they were found in ordinary dwelling houses and their smooth, worn bases suggest that were moved to and fro as grinders.' There is uncertainty about other specimens as well, for example, no. 25, pl. CIV, which may have been a *linga* or perhaps an unfinished weight (Mackay 1938: 408). Number 28, pl. CIV, of cherty limestone, is perhaps an 'unfinished linga'. Number 50, pl. CVI, of cherty limestone, is 'unfinished; and out of shape' and of unknown use. No. 55, pl. CVI, **[fig. 12.1/15]**, of soft limestone, is finely shaped and smoothed with a flat base; and three holes at the rounded top which meet inside the stone. Its base diameter is 2.45 inches (6.2 cm) and height 4.68 inches (11.8 cm). Mackay suggests it may have been a plumb bob but then, contradictorily, states that it was not a weight as is proved by the softness of the stone.

No. 2, pl. CXII, is described as 'very roughly made' of clay with a flattened base. 'Its rough make suggests that it was not a *linga*, unless it was made for temporary use at some particular festival, (Mackay 1938: 408-9). The most interesting of the stones is no. 29, pl. CIV (also shown on pl. XIV, 3 in Marshall's report; **fig. 12.1/8**). Made of brown limestone, well finished and semi-polished, it has a base diameter of 4.22 inches (10.7 cm) and height of 5.35 inches (13.5 cm). Two round holes at the bottom suggest that it may have been attached to some base.

'Indeed, there is every probability that this exceptionally well-finished stone is a *linga* which was stood upon a base', such as the hemispherical objects in pl. CIV, 22 and 26; CVII, 36 and 35, [my 9 & 10] described as 'pedestals' (Mackay 1938:411-12). But still Mackay has reservations about this interpretation because the stone does not conform to exactly what he knew as sacred *linga* in present-day contexts.

> Its top shows no signs of wear, nor are there any stains such as would have been caused by anointing it with butter as is the practice of the present day. (Mackay 1938:408).

One other conical object is described by Mackay in his section on stone weights (Mackay

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

1938: 402; pl. CVI, 54; **fig. 12.1/16**). Of hard, grey, cherty limestone, it has a basal diameter of 7.1 inches (18 cm), a height of 8.9 inches (22.6 cm) and is in almost perfect condition. In the rounded top, are two converging holes that show signs of considerable wear suggesting that the object was suspended during use. In form and size, it might as well have been included in the discussion of phallic-like stones but it is not mentioned in that context.

No new ring-stones were discovered in Mackay's DK Area excavations, but he does, in his report, give a fuller description of the ring-stones discovered in the HR Area and briefly described in the Marshall report. He provides the only detailed drawings of such stones and a tabulation of the dimensions and attributes of each of the ones found in the HR Area (**fig. 12.1/11 & 12**). It would also be of interest to know the dimensions and physical details of the ones discovered in the L Area on the 'citadel' but no mention is made of them here. There is some unexplained inconsistency in the accounts. Mackay states (Mackay 1938:595) that the total collection of Mohenjo-daro ring-stones amounts to twenty-seven specimens, four of which were too broken to be measured. His table on page 596 lists the twenty-three measurable specimens, all of which have HR Area field designations. So, were more such rings subsequently found in the same room, where the eighteen mentioned in Marshall's reports were discovered? No provenances, other than HR are given in the table. Also, in the Marshall report, it is stated that the stone rings were discovered on a paved floor, but in Mackay's report (Mackay 1938: 595), he says that they were found by Rai Bahadur Daya Ram Sahni 'between the levels three feet and six feet below the surface of the ground'.

At any rate, Mackay's descriptions and interpretation are of interest. After examining the total collection of stones, Mackay was even more certain that 'they had an architectural use' (Mackay 1938: 595). He described the central holes as 'well cut with straight edges' and showing no wear that could have been caused 'by the rings revolving on an axle' (Mackay 1938: 595). Contradicting Hargreaves' statement in the Marshall report, Mackay states that he cannot tell how the central holes were drilled and that there is no indication that the boring was done from both sides of the stone (Mackay 1938: 595). About half the stones have a line of from one to nine small circular pits at a tangent to the edge of the central hole. One stone has one pit, two have two pits, one has three, two have five, two have six, one has seven, one has eight, and one has nine. It is possible that most, if not all, of the stone rings originally had such marks but the surfaces on many are in poor condition. Because these lines of pits are on the flat side of the stones and would be obscured if the stones were stacked, Mackay says, this 'obviously suggests that they were intended for the guidance of the mason' (Mackay 1938: 595) with the number of pits indicating the order in which the rings were to be placed on a central pole to make a column. Although there are a couple of inconsistencies, the general pattern is, indeed, for the number of pit-marks to increase as the size of the stones decrease. This tends to support Mackay's suggetion since the largest stone ring, with the number one, would be at the base of the column and the smallest, with nine pits, would be at or near the top. The diameters of the central holes also increase regularly with the increase in the diameter and height of the ring-stones. This suggests to Mackay that the central pole was tapered. The stones then may have come from two graduated columns of fourteen ringed segments each of 'which conceivably supported the portico of a house or shrine' (Mackay 1938: 597). Given the dimensions of the rings, such column would have been over eleven feet tall (3.5 metre, approx.).

Recently a new suggestion has been made concerning the use of these stone-rings. Michael Jansen, head of a German team making architectural studies at Mohenjo-daro, informs me that he has measured and studied all these stone rings in detail and feels that the lines of small circular pits and the larger dowel holes served some sort of function for measuring angles and that the rings may have been used in making astronomical calculations. Details of this new hypothesis are forthcoming.

If, on the other hand, all, or part of the enigmatic stone objects at Mohenjo-daro had cultic or religious functions within the framework of Harappan religious beliefs and practices, one could logically assume that such objects would be found at all Harappan sites. This is, in fact, not the case. Even at Harappa, there are only a few stone objects identified by Vats as *lingas* and baetyllic stones. This he did following Marshall's

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

description of the Mohenjo-daro stones. As for the stone rings with undulating upper and lower surfaces that Marshall made so much about, they were found at Harappa in most unreliable contexts. Two of the largest (Vats 1940: pl. CXVII, 2 and 16—two feet in diameter (5 cm), over one foot high (30 cm), with a central hole diameter of 10½ inches (26.6 cm)—'probably' came from Trench B Area according to Vats (1940: 140), but, in reality, they were seen by Vats lying near the tomb of Naugaza atop the 'citadel' mound. They were known, and published years earlier by A. Cunningham in his *Archaeological Reports* (Vol. V, 106, pl. XXXIII, 8 and 9), another such stone was found by Rai Bahadur Daya Ram Sahni in the Harappa village (Vats 1940: pl. CXVII, 6). A doughnut-shaped stone ring with flat upper and lower surfaces, (diameter 1 ft., 8 inches or 50.8 cm hole diameter 10 inches or 25.4 cm) was recovered from the Harappa Police Station. (pl. CXVII, 3). Vats states that they were 'undoubtedly cult-objects, as shown by John Marshall, probably symbolizing the *yoni* or female principle' (Vats 1940: 140). Mortimer Wheeler (1947: 58-130) discovered no stones or rings in his 1946 excavations at Harappa and does not even mention them in his report.

At Chanhu-daro, Mackay (1943) discovered none of the large stone columns or rings. In discussing the small clay cones he states that he does not believe they were meant as *lingas* '... even though lingam-worship appears to have been practised in the Indus cities' (Mackay 1943: 71-72). S.R. Rao (1973) has reported no such objects from Lothal. Apart from the roughly shaped 'anchor-stones' discovered in the 'dock-yard,' he mentions only one stone weight with 'blind holes' similar to the one published by Marshall from Mohenjo-daro (Marshall 1931: pl. XIV, 3). While agreeing with Marshall that some of the Mohenjo-daro objects are phallic-like, he says that 'there is no convincing evidence to show that they had any religious significance (Rao 1973: 136). He adds that 'had they been represented on the seals, perhaps a religious significance could have been attached'.

The excavations at Kot Diji (Khan 1965), Amri (Casal 1964), Balakot (Dales 1979 a and b) and Kalibangan (to judge from preliminary reports) have yielded no convincing new evidence for *linga* or *yoni* worship. Also, my own excavations at Mohenjo-daro in 1964-65 uncovered no such objects although we did find numerous small baked clay and stone 'gamesman' (final report in progress).

Where then is the evidence to support published statements such as 'Phallic worship was an important element of Harappan religion' (Basham 1954: 24)? With the single exception of the unidentified photography of a realistic phallic object in Marshall's report (pl. XIII, 3), there is no archaeological evidence to support claims of special sexually-oriented aspects of Harappan religion.

REFERENCES

Basham, A.L. 1954. *The Wonder That Was India*. New York.

Casal, J.M. 1964. *Fouilles d' Amri*. Paris.

Dales, G.F. 1979 a. The Balakot Project: Summary of Four Years' Excavations in Pakistan. In *South Asian Archaeology 1977*. M. Taddei ed. Naples. 241-274.

———. 1979 b. The Balakot Project. *Man & Environment*. Vol. III; 46-53.

Khan, F.A. 1965. Excavations at Kot Diji. *Pakistan Archaeology*. No. 2; 11-85.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro*. 2 vols. New Delhi.

———. 1943. *Chanhu-Daro Excavation 1935-36*. American Oriental Series. Vol. 20. Boston.

———. 1948. *Early Indus Civilization*. London.

Marshall, Sir John. 1931. *Mohenjo-daro and the Indus Civilization*. 3 vols. London.

Rao, S. R. 1973. *Lothal and the Indus Civilisation*. Bombay.

Tringham, R. 1978. Experimentation, Ethnoarchaeology and the Leapfrogs in Archaeological Methodology. In *Explorations in Ethnoarchaeology*. R.A. Gould ed. Albuquerque. 169-199.

Vats, M.S. 1940. *Excavations at Harappa*. 2 vols. Delhi.

Wheeler, R.E.M. 1947. Harappa 1946: The Defences and Cemetery R 37. *Ancient India*. No. 3; 58-130.

———. 1968. *The Indus Civilization*. 3rd ed. Cambridge.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

13

Jonathan M. Kenoyer

Chipped Stone Tools from Mohenjo-daro

The presence of chipped stone tools alongside copper and bronze tools led the first excavators of Mohenjo-daro to use the term 'chalcolithic' to describe the technological aspects of the large urban site (Marshall 1925-26: 75; Mackay 1928-29: 75). The large areas of the site which were excavated during these early expeditions could have provided us with large samples and invaluable data concerning the role of stone tools in what appears to be predominantly copper-bronze technology (Wheeler 1968: 78-79). Unfortunately, in the course of these massive excavations only the most complete and unique examples of stone tools were collected and recorded. The resulting bias in sampling and the lack of a detailed recording system for the data have made it impossible to conduct any quantitative or qualitative statistical studies of these stone artefacts.

In 1964-65 G.F. Dales, heading an expedition from the University of Pennsylvania, conducted the last and most recent excavations at Mohenjo-daro. From the small area in which he was excavating he was able to collect an assemblage of chipped stone tools which has provided us with some new and important data. This being the only collection of stratigraphically excavated lithics from Mohenjo-daro, the first objective of this study is to provide a detailed description of the morphological features of the assemblage and the relative frequency of the morphological types. The second objective is to distinguish specific functional features of the tools and to determine what types of analysis need to be undertaken to provide us with more reliable data concerning these features. Finally, we will examine the question of the functional role of these stone tools in the copper-bronze technology of Mohenjo-daro and other sites of the Indus Period.

Site Description and Sampling

The site of Mohenjo-daro is presently situated on the west bank of the Indus River in Larkana District, Sind, Pakistan. The site consists of artificial mounds which extend over an area with about a five kilometre circuit (Wheeler 1972: 14). These mounds are generally divided into two parts: the so-called 'citadel' mound to the west, which rises some twelve metres above the present plain level and a lower mound which covers over six times the horizontal area of the high mound. This lower mound is separated from the high mound by a wide sandy finger of the present Indus flood plain.

The area excavated by Dales was located on the western edge of this lower mound near what has been designated the HR Area. Part of the excavation took place on the top of the mound, which is about 10.5 metres (35 feet) above the surrounding plain level (Dales 1966). The remainder of the excavation was on the face and at the base of the mound. This latter area included a deep sounding which went down 4.5 metres below the plain level to the top of the water table. The total volume of earth excavated has not been calculated but the total surface area is roughly 1700 square metres. Due to the eroded nature of the edge of the mound and the short excavation season, the exact relationship of these

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

two areas has been difficult to determine, but the first metre of accumulation at the base of the mound is definitely mixed with artefacts which were redeposited from the upper part of the mound (Dales, personal communication).

Although the final interpretation of the excavated area is still being worked out, it appears that the upper edge of the mound was made up of structures with close-fitted brick floors (Dales, personal communication). These are similar to other structures found by earlier excavators which were called bathing areas and wash floors. Below these structures, down slope, is an extremely large mud brick platform which appears to stand the entire height of the mound itself, 10.5 metres along one edge of this platform is a stepped drain which goes from the top of the mound to the base, where it empties out into a sump pot. At the base of the mound is a wide street which is lined on both sides by baked brick walls and the foundations of older buildings. The ceramics and the architecture indicate that the excavated levels belong to the Mature Phase of the Indus Civilization, which begins approximately 2400 B.C. (Dales 1977: 254) and ends around 1800 to 1700 B.C. (^{14}C dates).

The lithic sample collected from this excavation consists of all flakes, cores, blades and fragments of worked and unworked stone which were found. The sample was not collected by screening so we do not know if there were any minute flake fragments present in this area, however the range in the size of the collected artefacts indicates that the workmen were quite careful at picking out very small fragments as well as larger ones.

The sample itself consists of only 115 artefacts, so it has not been feasible to make a morphological comparison of the lithics from the upper part of the mound with those found in the lower excavation. Unfortunately, due to the small size of the sample, it has also been impossible to carry out even simple statistical studies with reliable results, on the morphological and technological features of the artefacts. But, it has been possible to compare the basic features of the assemblage with those reported by J. Cleland in his detailed analysis of the stone industries of the entire Indus Region (Cleland 1977).

Due to the limited time and circumstances at the time these artefacts were available for study, we were not able to carry out micro-wear studies using high powered microscopes. However, through a detailed examination of edge damage using a 20X hand lense and a comparative study of the morphological features of our sample and that which has been reported from other contemporaneous sites, we have been able to distinguish some important new features of the lithic industry at Mohenjo-daro.

Raw Material And Source Areas

All of the chipped stone artefacts in our sample are cryptocrystaline silicate (hereafter referred to as chert), but there is a range in colour and shading, as well as in the quality of the chert (see Table 13.1). Most of the artefacts can be grouped in the general category of fine-grained grey chert, 86.95 per cent. Within this category we see 70 per cent unmottled, plain greys with shades ranging from greyish white to dark grey. Banded cherts comprise 22 per cent of this group, with different shades of grey banded with brown, and 8 per cent are mottled with splotches of grey, white or brown. Fine-grained cherts with a predominantly brownish colour make up 6.95 per cent of the sample and the ramaining 1.7 per cent are of a very outstanding dark brown to reddish-brown colour.

Most of the artefacts were made from fine-grained, good quality chert which had no inclusions, 95.6 per cent. The remaining 4.4 per cent were made from a coarser grained chert, but even these do not exhibit any flaws or large inclusions. This difference in texture is probably only a normal range of variation, but in a larger sample it may be possible to interpret this in terms of functional or cultural selection.

The earlier excavators at Mohenjo-daro reported that the chert artefacts from their excavations were predominantly brownish-grey and often mottled (Marshall 1931: 458; Mackay 1938: 395). Their term would probably include the whole range of greys and brownish-grey which we have mentioned as well as including both fine and coarse textured cherts. If we lump all of these together in our sample we get 98.3 per cent brownish-grey cherts.

In the comparatively small area excavated by Dales it is not surprising to find a uniformity in the raw material, but when both Marshall and Mackay report a uniformity of raw material throughout their excavations, one begins to wonder where the source of all of this stone is. The

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

earlier excavations represent several hundreds of years of occupation and encompass nearly one-third of the total horizontal area of the site. The Rohri Hills have generally been assumed to have been the primary source area for the cherts used at Mohenjo-daro and other Indus region sites. This source of chert is still being used as a source for road fill. Allchin's recent survey of the Rohri and Sukkar hills has reliably confirmed the presence of many Harappan working floors which are strewn with flakes and blades, cores and waste flakes identical to those found at the major Indus Period sites. The majority of the chert is a 'buff or grey with a patina either of cream or of mottled black and rust colour' (Allchin1976: 477). This colouring is basically the same as that reported by Marshall and Mackay and that of the artefacts in our sample, except in terms of the patina. Most of the excavated cherts have no patina according to Marshall (Marshall 1931: 458), but from our sample there are some examples of cream-coloured patina and one example of a mottled black patina.

The similarity of the technological and physical characteristics between the Harappan blade industry at the Rohri Hills quarry area and that of Mohenjo-daro, and the actual proximity of the two sites, (80 kms) suggest that the Rohri Hills were the actual source for the majority of the chert used at Mohenjo-daro.

There are however some artefacts of a dark brown to reddish-brown in our sample. This colour has not been reported from the Rohri Hills area and though it is possible that such exotic coloured nodules of chert may occur in that area, it is also possible that they may have come from other unknown quarries or collection areas. Allchin reports that there are sources for chert to the west of the Indus in the Kirthar Range (Allchin 1976: 476) but unfortunately he does not identify specific sites. Louis Flam has noted several sites in this general region which have chert artefacts which do not look as if they were made from the characteristic Rohri chert. (Flam 1976-1977 Survey in Sind: Personal Communication). Some of the Harappan sites in Kohistan include Damb Buthi, Dhal Buthi, Karchat, Taung, Nuka, Bandhri and the Early Harappan sites include Phang, Khajur and Bandhni. Further north on the plain, he reports that non-Rohri chert is found at Lohumjo-daro and also at Judeirjo-daro in the Kachhi Piedmont. It is interesting that at one of the piedmont sites, Gorandi, which is near the Kohistan sites, he reports that only a Rohri type chert was to be found.

There are probably many sources for the chert found at these various sites, and one of them may have been the source for the exotic coloured cherts found in our sample. This new data provides a further challenge for sorting out the role of Rohri cherts at Mohenjo-daro and also indicates that their lithic assemblage is not quite as uniform as has been thought in the the past.

Description Of Morphological Characteristics

The morphological features and detailed measurements of the artefacts were first recorded and classified in Karachi, 1979. For the purposes of comparison with Cleland's extensive study of Indus region lithics, certain modifications were made in our terminology in order to simplify discussion and avoid confusion.

In this assemblage we have six basic morphological types; true blades **(figs. 13.1, 2)**, crested blades **(fig. 13.3/1)**, blade-like flakes with and without cortex (Cleland 1977: 182), cortex flakes **(fig. 13.3/2)**, secondary flakes **(fig. 13.3/3,4)**, and blade cores **(fig. 13.3/5-9)**. No flake cores were found in this collection nor have they been reported in any of the previous excavations of the site (Table 13.2).

True blades are defined by three characteristics; parallel or nearly parallel lateral edges, triangular or trapezoidal cross sections, and a length: width ratio of 2:1 or greater. This last criteria is not strictly applied to blade fragments. A complete blade must have a proximal end which is distinguished by a striking platform and a bulb of percussion on the ventral face, and a distal end which in our sample is characterized by a narrowing or widening of the blade to an abrupt edge or point. The very tip often has a 'hinge' or ripple and occasionally there is a distal scar on the ventral face.

Due to the fact that we have 101 blades and blade fragments in our assemblage, it has been possible to compare their mean measurements with those recorded by Cleland for his Indus sample (Table 13.3). Cleland's Indus Region Sample is a combination of all artefacts for which he was able to collect reliable measurements, from a range of different types of sites throughout the Greater Indus region. These sites are from differ-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ing time periods and the samples were collected using differing sampling strategies. His reasons for lumping all these assemblages together was to determine variation on the regional level, and inferences were made only after looking at each assemblage separately (Cleland 1977: 30-31). The significance of our comparison with his samples lies in the fact that his is the only detailed analysis of the Indus region lithics which is available to us and, by such a comparison, we will be able to isolate features within our sample which warrant more study.

Our sample has only six complete blades and their mean measurements tend to be slightly longer, narrower and thinner than the mean blade measurements reported by Cleland. He also reports that in a sample of 36 unbroken blades, those with trapezoidal sections averaged slightly wider and thinner than blades with triangular sections (Cleland 1977: 40-41, no figures given). But then, he states that in a larger sample of broken and unbroken blades, those with trapezoidal sections were found to be somewhat thicker and they were still somewhat wider than the blades with triangular sections. This cannot be so with our sample where we find exactly the opposite of what Cleland reports. In our sample, we see 59 examples (58.4%) of double-ridged blades with trapezoidal cross sections; 18 examples (17.8%) with single ridges and triangular cross sections; and the remaining 24 blades have combinations of single, double or multiple ridges. Double-ridged, trapezoidal section blades have a mean width: thickness of 1:.245 (sd-.079) as opposed to that of triangular section blades, 1:.27 (sd-.06). This is not a significant difference within this small a sample, but by doing this type of analysis on blades from a quarry area such as the Rohri Hills, and comparing it to Mohenjo-daro or other major sites, we can determine whether or not these blades were being made by the same workmen and being traded or if they were being made by two different groups.

The mean length to width ratio for complete blades is also slightly different from that reported by Cleland (Table 13.3). Our sample is admittedly quite small, but the fact that there is a close correlation in the mean width:thickness ratio (1:.363 & 1:.33) and not in the other ratio is cause for closer examination of the discrepancy. In Cleland's sample there is a strong clustering of complete blades (48.3%) between 4 cm and 6 cm in length. He attributes this to a culturally preferred length of blade, but one might try to examine the probability of that size of blade to survive unbroken and then take into account the bias of earlier excavators to collecting larger blades, before inferring cultural selectivity.

Looking at other morphological features of the blades, we have a total of 36 proximal portions with striking platforms. Sixteen of the examples (45%) appear to be from unaltered striking platforms, consisting of a flat flake surface; four examples (11%) seem to have come from slightly trimmed platforms; and five (13%) appear to be from carefully retouched or faceted striking platforms **(fig. 13.1/12, fig. 13.2/1)**. This retouch is identified as such on the basis of the regularity of the flaking. On the remaining eleven artefacts (31%) the striking platforms have been fractured by the impact of the blow of blade detachment, and it is impossible to determine the original form of the platform. The mean breadth and thicknes of the striking platforms are .71 and .36 cm. respectively. (Measurements were taken on only 11 striking platforms.) The mean thickness:breadth ratio is 1:2 (minimum is 1:1.5 and maximum is 1:4). This ratio is probably indicative of an indirect percusion or a punch technique and we can see an attempt to keep the platform as thin as possible to obtain thin and yet sufficiently wide blades. Replicative experiments using this same quality of chert would be able to determine if this hypothesis is correct or not. It is interesting to note that two of the proximal fragments have no bulbar scar.

Among a total of 29 intact distal portions of broken and unbroken blades, we see ten examples having distal scars (38.5%) and five of these also have a ripple or hinge at the very tip **(fig. 13.1/6)**. The distal scar suggests that some form of anvil was being used in blade manufacture. One of the miniature blades has a hinge, but no distal scar could be discerned **(4.4%, fig. 13.1/4)**. The remaining eighteen examples have neither a scar nor a hinge and are distinguished only by their unbroken end (62.1%).

Looking at the comparative measurements for proximal fragments in Cleland's sample, we can see a basic similarity in mean length and width, but the fragments in our sample are slightly thinner (Table 13.3). We might also note here that the mean length of the proximal fragments is slightly longer than that of the other fragments

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and is more than half of the mean length of the complete blades. This would probably indicate that there was no conscious snapping-off of the striking platform to obtain a more uniform, straight edged blade as has been suggested by B. Allchin (1979:177).

In terms of distal fragments we have smaller mean measurements for length, width and thickness. The midsection fragments from our sample have a mean length of 3.64 cm while Cleland reports a mean of 4.16 cm. The mean width and thickness correspond quite closely.

A further comparison for certain measurements of blades from Mohenjo-daro can be found in B. Allchin's study (Table 13.3). The mean width for all of our blade fragments is 1.23 cm while Allchin reports a mean of 1.4 cm. For whole blades (without the tiny 'micro'-blades) our mean width is 1.4 cm compared with 1.79 cm from Allchin's sample. This latter discrepancy could be due to the sampling bias for large blades by the early excavators.

Most of the discussion of measurements has been with reference to the fine-grained cherts. However we do have five examples of blades, made from a coarser and heavier chert. These few examples do not show any marked difference from the other fine-grained cherts in term of the width: thickness ratio. So we cannot discuss any morphological difference between two. However, with a larger sample we might be able to determine if there was a sepcialized functional role for the coarser grained chert tools, or perhaps they appear only through the chance use of a different quality raw material.

The second morphological type is the Crested Blade (Cleland 1977: 181). This term is used to describe the blade-like flake which is removed from a prepared core prior to the removal of the blades. Crested Blades 'resemble true blades in proportions, but are marked on the dorsal face by a sinuous ridge created by alternate (usually) directional flaking' (Cleland, ibid.). Our example is what Cleland calls a partly-crested blade in that the flaking is only unidirectional **(fig. 13.3/1)**. It looks very much like a platform rejuvenation flake, but in fact the flake scars on the one edge are not blade scars, but rough trimming flakes, and the blade has been removed from the long axis of a rough core. The presence of this blade at the site is very important since it indicates core preparation at the site itself. This blade has no edge damage and was therefore probably discarded after its removal from the rough core. The absence of large quantities of cortex flakes, specifically long cortex flakes, suggests that rough core blanks may have been brought to the site. Cleland reports a 'proto-blade core' from Mohenjo-daro and the large bifacially flaked celt-like objects reported by Marshall and Mackay may in fact be rough core blanks (Marshall 1931: Vol.3 pl. CXXXI, 17-19; and Mackay 1938: Vol.3, pl. CVI, 56). Even if these were not used to make blade cores, they may have been blanks used for the manufacture of chert weights or other chert artefacts.

Blade-like flakes are flakes which approximate the minimum definition for a blade but lack their true symmetry and regular cross section (Cleland 1977: 182). There are three examples of such flakes, one with cortex and two without cortex. The latter two may have been the result of accidents in the course of blade production; and the former, which is quite large, may have been removed in the manufacture of some large chert object, such as a weight.

Cortex flakes result from the removal of the weathered surface of a chert nodule and retain some of this weathered surface on the dorsal face of the flake. The cortex on our flakes is less than 10 per cent of their dorsal face and are classified as Trivial Cortex Flakes by Cleland. The presence of these flakes suggests that some of the primary shaping of chert objects or cores was actually done at the site.

Secondary flakes are variously shaped flakes which have no cortex on any part of the flake. But of the secondary flakes found were retouched or edge damaged, but since no flake cores have been reported from Mohenjo-daro it is suggested that these came from the primary shaping of some large chert object, and that their use as tools is not a primary feature of the lithic industry at Mohenjo-daro. Flake cores have been reported from smaller sites such as Amri, Balakot and Allahdino (Cleland 1977).

The five blade cores found in our sample can all be classified as polyhedral cores. They have blade negative scars on their entire radius, forming a cylindrical or conical polyhedron, and their striking platforms from nearly a 90° angle with the core face (ibid., 183). One of these cores is a bi-polar core, with striking platforms at both ends **(fig. 13.3/7)**. On all but one of the cores the strik-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ing platform consists of a flat flake scar which has been lightly trimmed along the edges to facilitate blade removal **(fig. 13.3/6, 7,8)**. The one exception is a very small core, 5.4 cm long and 1.5 × .8 cm thick at midpoint **(fig. 13.3/5)**. On this core, the flat flake striking platform is not trimmed at the edges. All of the cores except this small one have been re-used in a secondary manner such that the ridges on one or more faces have been rubbed and worn smooth.

Although the sample is small, the presence of a bi-polar core, a small, almost 'micro'-blade core, a partly-crested blade, and a variety of cortex and secondary flakes, provides us for the first time with a new picture of the lithic assemblage at Mohenjo-daro. Marshall had reported that flakes and cores were found in abundance in most of the houses, but the published reports did not contain any mention of cortex or secondary flakes. Now that we have a collection of at least some of the manufacturing debris, and a better sampling of blades and blade fragments, we have been able to compare specific morphological features with those reported by other researchers. In some of these comparisons we have seen some discrepancies which can only be resolved by the proper implementation of sampling procedures and through detailed experimental and problem-oriented studies.

Description Of Functional Characteristics

Before discussing the functional characteristics of the assemblage, it must be pointed out that we are only discussing those features which were visible with the aid of a 20X hand lense. In order to avoid making inconsistent subjective decisions, as to which edge damage was the result of retouch and which was attributable to utilization or natural processes, all edge damage was classed as either light or heavy, unless there was definite evidence for regular retouch. Light edge damage was defined as minute flaking which did not alter the original edge angle or the natural edge line of the blade (one or two isolated flake scars were not considered as alteration of the edge line). Heavy edge damage refers to flaking which has changed the original edge angle and has altered the natural edge line of the blade. There are some examples of definite retouch which can be distinguished by a regular pattern of flaking to form a steep edge or to alter the edge line.

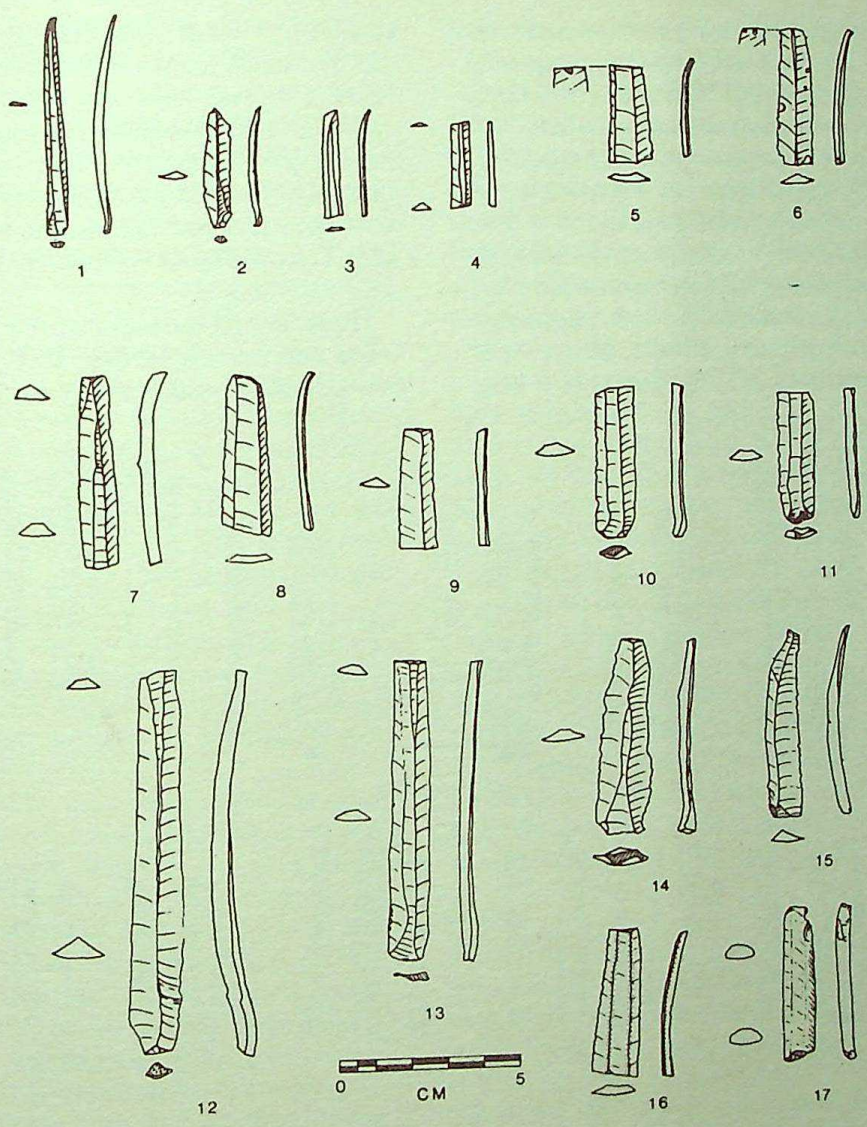
Edge damage can result in flaking on the dorsal or ventral face, or both together. It must be remembered that flake scars on the dorsal face result from pressure exerted against the edge of the ventral face and *vice versa*. When you have bifacial flaking, it may be the result of alternating pressure from both directions or the result of heavy pressure directly perpendicular to the blade edge. This latter form of flaking generally results in step flaking which gives the appearance of battering.

Admittedly, the use of the terms heavy and light edge damage are themselves somewhat subjective in that arbitrary visual distinctions are used to define the terms. But, by using these terms, we avoid the assumption inferred by the use of retouch or utilization; that is, intentional reshaping or use by human agency. These terms will also be slightly confusing when trying to compare these artefacts with previously reported ones, but until proper experimental studies and micro-wear analyses are carried out on these blades, the term retouch cannot reliably be applied to the edge damage seen on most of these blades. Cleland also noticed this problem and mentions that in the tools from Harappa he saw a 'gradient of edge condition types along which no clear demarcation between retouch and utilization could be drawn' (Cleland 1977: 127). We would go one step further and say that there is no clear demarcation between edge damage by human agency and edge damage from some natural agencies, such as trampling.

Blades

Looking first at the blades and blade fragments, we see a complex assortment of varying degrees of edge damage on one, or both edges of the blades (Table 13.4a). There is definitely no predominant uniformity of edge damage in this assemblage. Blades with slight edge damage on both edges and with flaking on both faces account for 45.4 per cent of the total sample of 97 artefacts. There is a macroscopic uniformity among these slightly edge damaged blades, but it must not be assumed that this uniformity is a reality until micro-wear studies have also been done. These blades may have been used in many different functions or on very specific materials. Some of these blades were probably intentionally truncated and note should be made of three very short midsections, one of which has retouch **(fig.13.1/2-12, 13, 14)**.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



Small "Micro" Blades 1-4;
Blades with Slight Edge Damage 5-15; Gloss on Ridges 16; Smoothed 17

Fig.13.1. Mohenjo-daro: Blades

Four miniature blades which have slight edge damage along one or both edges are unique for Mohenjo-daro **(fig. 13.1/1, 2, 3, 4)**. There is no conclusive evidence for a specialized micro-blade tradition at Mohenjo-daro or any of the other contemporaneous Indus Period sites, but it appears that these blades were being produced at the site itself. The long blade (4) was found in a level which also contained a miniature blade core of comparable colouring, texture and size **(fig. 13.3/5)**. There is a strong possibility that these miniature blades were produced for a specific function since they are so much smaller than the other blades found at the site.

Blades with heavy damage, bilaterally and bifacially, comprise 16.5 per cent of the sample. Some of these heavily edge-damaged blades would probably have been classified as retouched by the earlier excavators, but due to the irregularity of the flaking and our ignorance of how these blades were used and what type of flaking would result from those uses, they have been kept in the category of 'Heavy Edge Damage'. Two of these blades show very heavy flaking on both edges, with mostly ventral flaking on the left edge and dorsal flaking on the right edge **(fig. 13.2/3, 5)**. Another example, but of coarse grained chert. has exactly the reverse **(fig.**

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

13.2/7). An example of heavy bilateral and bifacial 'nibbling' can be seen on two exceptionally long blade fragments **(fig. 13.2/1, 2)**. This nibbling' is actually alternating directional flaking, and can be caused by heavy sawing on a hard substance, i.e. incising shell (personal experiments) or it can be the result of intentional retouch.

Some of the blade fragments have definitely been retouched along one or both edges. One blade shows regular flaking on both edges running the entire length of the blade, with most of the flaking occurring on the dorsal face **(fig. 13.2/15)**. A small truncated fragment shows retouch primarily on the ventral face **(fig. 13.2/14)**. Another fragment has very steep edge angles resulting from heavy retouch on the dorsal face and some light flaking on the ventral face **(fig. 13.2/16)**. The distal end of one blade has been retouched to form notches and a blunt end **(fig. 13.2/9)** and another has been notched on the left edge **(fig. 13.2/10)**.

There is one example of a naturally backed 'edge and point tool' **(fig. 13.2/18)**. The 'backing' actually consists of the negative flake scar of

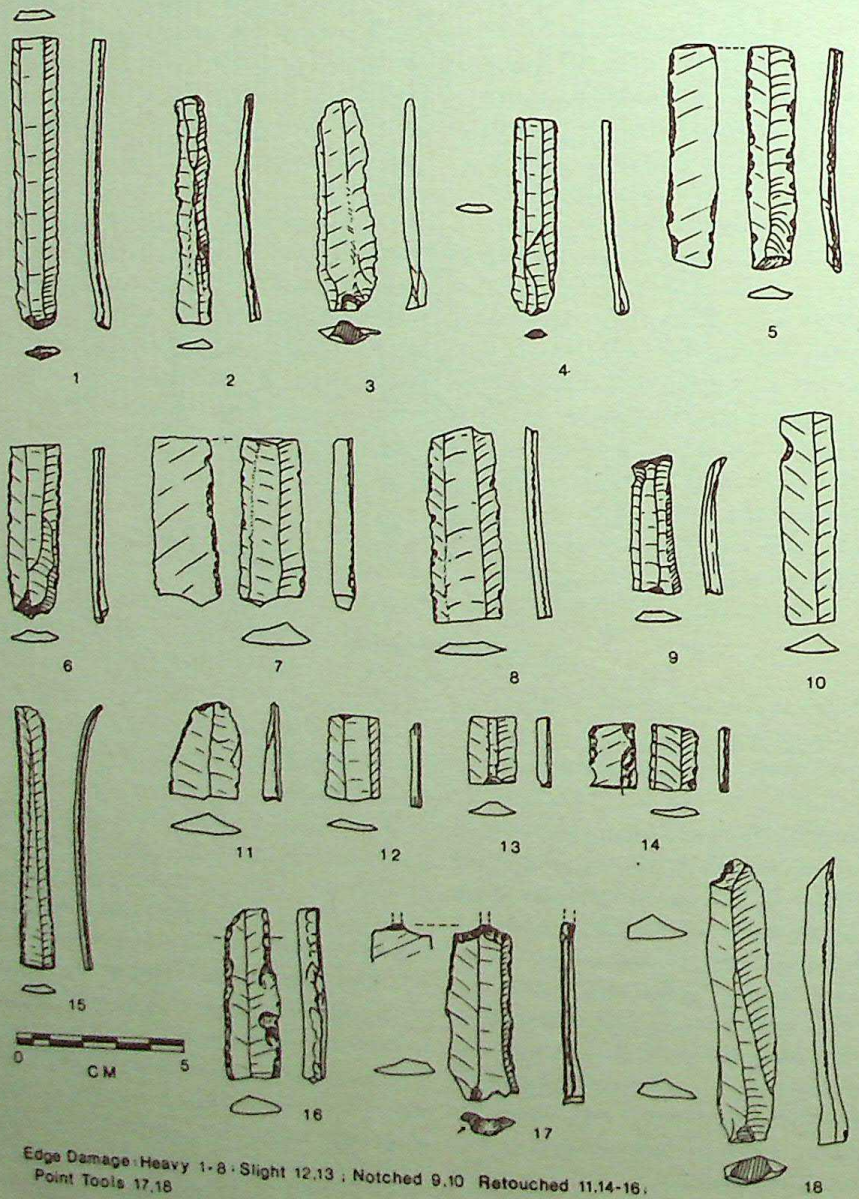


Fig.13.2. Mohenjo-daro: Blades

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

a blade which was removed prior to this one (there is no evidence for any intentional backing of blades at Mohenjo-daro as is common in Late Upper Paleolithic or Mesolithic industries in other parts of India). The right edge of this blade has heavy edge damage and at the distal end there is bifacial retouch which forms a notch or point, depending on which way the tool was used.

One of the most important blade tools is a multifunctional Borer and Edge Tool, whose delicate point or bit has been broken off at the base **(fig. 13.2/17)**. This blade has been retouched bilaterally and bifacially to form a boring tool at the distal end. The lateral edges of the remainder of the blade also show some heavy edge damage. The point was .25 mm wide at the base and we do not know how long it was. This is the first example of a borer to be published from Mohenjo-daro although Marshall and Mackay both reported that they were found. The form of this borer is somewhat different from those used at Chanhu-daro for drilling beads, but since we are missing the bit, we cannot determine what material was being drilled.

Two of the blades which have heavy bilateral and bifacial edge damage also have a glossy sheen on the double ridges on the dorsal face **(fig. 13.1/16)**. This glossy sheen is macroscopically distinguishable from that found on the lateral edges of another blade. The gloss on this blade occurs on the ventral and dorsal faces of the lateral margins, which are also very heavily edge damaged. Microscopic analysis would be able to determine if there actually is a difference in the gloss on these blades, or if the difference in appearance is due to a varying intensity of utilization on the same material.

The remainder of the blades have dissimilar edge damage on each edge. In 7 per cent of the blades, edge damage occurs only on one edge; 3.9 per cent have heavy edge damage on the right edge and slight on the left while 6.9 per cent have the reverse, heavy edge damage on the left edge and slight on the right.

Looking at Table 13.4a we can see that for almost every type of combination of edge damage on the left and right edges, we have examples of the reverse on the right and left edges of another blade. Cleland comes to the conclusion that so long as the classification of a blade is made on the type of edge damage and the size of the blade, then the left or right-handedness of the edge damage does not generally effect the functional class within which a fragment is classified (Cleland 1977: 62). He bases this on his findings for the Indus Region Sample where, 'in no case did the mean length, width or thickness of any type of treatment on right edges differ significantly at the .05 confidence level from the same treatment on the left edge' (ibid.). He also points out that 'There are significant differences in mean lengths, widths and thicknesses for blades with each type of edge treatment, suggesting that blades were consistently selected on the basis of their dimensions for particular types of tasks' (ibid.). Due to the small size of our sample we have not been able to carry out such a detailed analysis of this feature, but it appears as if our fragments do correspond to Cleland's findings.

Out of all the blades recovered, only three were totally without macroscopically visible edge damage. Two blade fragments were found which appear to have been rolled or rubbed **(fig. 13.1/17)**. The one which has been illustrated has been so much altered that all previous traces of edge damage have been removed. The smooth polish on this fragment suggests that it is similar to a blade fragment which Mackay calls a wood polisher (Mackay 1938, Vol.1: 395).

Flakes

Flakes do not make up a large percentage of the lithic assemblage but of the ones that we do have, most show heavy edge damage and retouch, suggesting that they played an important role as specialized and multifunctional tools. The two secondary flakes are quite large and one has large notches on either edge which have been formed by retouch **(fig. 13.3/4)**. Both of the notches on this flake show heavy edge damage on the projecting points of the notch and not in the concave centre. This type of notched flake has often been referred to as a 'spokeshave' but we really have no indication as to their actual function. The other secondary flake has bifacial retouch on all edges and two of the edges converge to form what appears to be a point, which is now broken off **(fig. 13.3/3)**.

Two of the cortex flakes have heavy edge damage on one or more edges and they can simply be classified as single and double sided edge tools **(Table 13.4b)**.

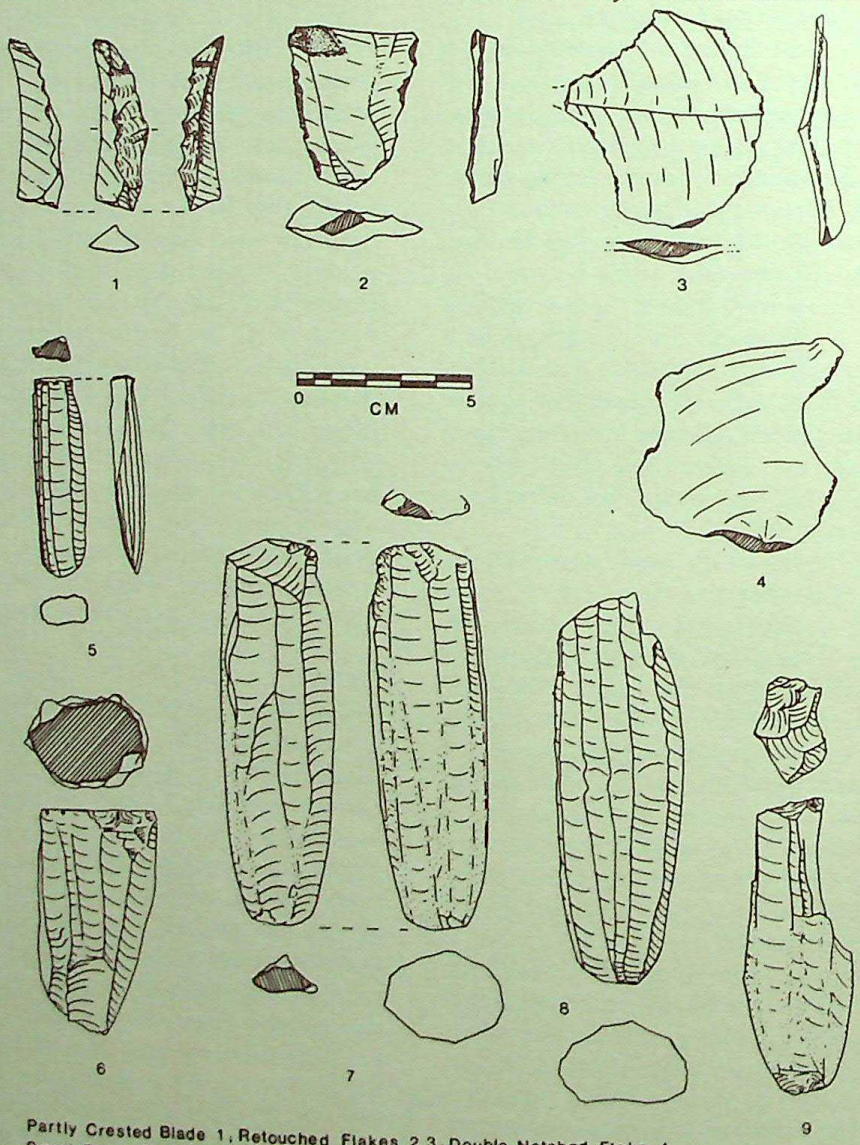
Cleland was able to examine quite a large number of flakes from Allahdino and Amri,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and suggests that flakes may have been used in a greater range of specialized functions than blades. He found that flakes tended to be large, and that there was a much higher frequency of point tools and multifunctional tools on flakes than on blades. Most of the flakes which Cleland studied came from the smaller sites of the Indus region, with only 12 flakes coming from the larger site of Harappa. The low number of flake tools in our sample from Mohenjo-daro (4, about 4%) suggests that the large urban centres were not using specialized flake tools as much as the smaller sites. The larger sites may have been using copper-bronze tools for the same functions that flake tools were being used for in the smaller sites.

Blade Cores

All four of the larger blade cores in our sample show secondary utilization in the form of abraded and polished ridges on one or more sides of the cores. Macroscopically, no distinct pattern can be distinguished on these polished portions. Mackay and Marshall both report similar sizes of blade cores with polish on their ridges, and refer to them as burnishers (Mackay 1938, Vol.1: 395;



Partly Crested Blade 1, Retouched Flakes 2,3; Double Notched Flake 4; Small Blade Core 5, Polyhedral Blade Cores 6-9; Bi-polar Core 7

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Marshall 1931: 458). A more detailed microscopic analysis could probably provide us with a better idea of what caused this polish. The small blade core shows no sign of polish on any of the ridges and possibly it was too small to be used as the larger cores were.

Functional Types

In this paper, the term 'edge tool' has been used to describe the variously utilized or edge-damaged blades and flakes. In the past, all such artefacts were classified as single or double side-scrapers, but in view of our previous examination and discussion of edge damage, we can see that various activities such as cutting, sawing, incising, and scraping, all contribute to various forms of edge damage. The term 'scraper' refers to a tool with retouch or utilization basically on one face of the working edge, and in our discussion of functional types, this term would be misleading.

On the basis of some casual experiments using chert blades collected from the surface at Mohenjo-daro it was noted that sawing or incising a relatively hard substance such as shell or steatite resulted in light to heavy flaking on the dorsal and ventral margin of the blade. When a piece of conch shell was sawn to the depth of 1 mm or to where the blade became pinched on the groove, we found that larger flakes were chipped off both faces of the blade and the edge was quickly reduced to an irregular cutting edge. It could be seen from this experiment and by examining the cut marks on the shell, that stone blades could be used for incising the shell, but they could not have been used to cut off sections of the shell for making bangles or other ornaments. No denticulated blades have been reported from Mohenjo-daro and since we do have specialized copper-bronze saws, it is doubtful that stone blades were used for the deep sawing of hard substances such as stone, shell, or wood.

It is not likely that all the blades we have, represent tools used for incising or general cutting purposes. The small truncated fragments suggest a very specialized function and these fragments were probably hafted in some manner.

The blades which have a heavy gloss on the dorsal ridges and heavy edge damage, do not appear to have been used for cutting grain or grasses, but what their function might have been is unknown. The other blade, with gloss along both edges, could possibly have been used for cutting grain, and through microscopic analysis this could be substantiated.

Multifunctional tools provide us with a little better insight as to their functional roles on the basis of distinctive morphological features. However, these too must undergo further analysis to determine what types of raw materials they were being used on and exactly what part of the tool was getting the most wear. Marshall mentions that borers were found in one area of the site, probably refering to Site A, the low mound on the eastern edge of the main mound (Marshall 1925-26: 86), but unfortunately, none of these very important tools were ever published. Evidently, some of these tools were collected because D.H. Gordon, in his re-analysis of the materials from both Marshall's and Mackay's excavations reports that out of 1,408 specimens, '22 were retouched along one side, 14 were retouched on both sides, including three retouched and worked to form a pointed awl-like tool ...' (Gordon & Gordon 1940: 7).

Notched flakes have been reported from many contemporaneous Indus sites but Marshall reports that they were not found at Mohenjo-daro (Marshall 1931: 458). Interestingly enough, we have one slightly notched blade and even a double-notched flake. Furthermore, Gordon reports that he found six blades with nicks on one side and seven with nicks on both sides of the proximal end, 'possibly to take a fastening, and two were worked into a definite tang' (Gordon and Gordon 1940: 7).

Although we did find blades and blade cores which had been rubbed and polished, our sample does not have any examples of the polished, spindle shaped 'burnishers' reported by the earlier excavators. If any one of these types of artefacts had been used to actually burnish wood, metal, or stone, we should be able to distinguish different patterns of abrasion; and if they were used on metal, X-Ray Florescence Analysis might be able to tell us what type of metal they were used on.

It is extremely important for us to begin experimental studies and microscopic analyses of the tools from the Indus region sites, in order that we can better understand the functional role of stone tools at these various sites. The range of morphological types is not that large, and it appears that stone tools have a very specific role in the predominantly copper-bronze technology of the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Indus Civilization. It is therefore concievable that we will be able to determine the place and function of these stone tools during this period.

Discussion And Conclusion

Having presented a detailed description of the morphological and functional characteristics of the lithic assemblage, we can see that there is more diversity in the chipped stone industry at Mohenjo-daro than was reported by the earlier excavators. Furthermore, we would expect that if we had more representative samples at other large urban sites, such as Harappa and Chanhu-daro, we would see greater diversity in the lithic assemblages there as well.

The idea that blades served only as general purpose household knives or all purpose tools (Marshall 1931: 458), was basically due to a lack of detailed analysis. We see in our assemblage, several different forms of multifunctional and specialized blade and flake tools. We also have a wide range of edge tools with varying degrees of edge damage and utilization. The presence of miniature blades and a blade core provides a whole new facet of the blade technology in practice at Mohenjo-daro, and this probably reflects an undiscovered feature of blade technology at many other contemporaneous sites.

The assumption that blades were being removed at the site was put forth by Marshall, but due to the lack of cortex flakes and other manufacturing debris, there has been some doubt as to what proportion of the blades were actually being detached at the site and how many were being brought in from other manufacturing areas. The examples of a crested blade, cortex flakes and blade cores in our sample suggest that at least some of the blade production happened at the site itself.

Although Marshall had reported that there were no short flakes at the site, either notched or un-notched, in our sample we have found several examples of 'short flakes' as well as two examples of notched tools.

The fact that we have a range of specialized tools within this assemblage brings us to the question of explaining their role within a somewhat advanced copper-bronze technology. The earlier excavators also addressed themselves to this question:

'It is evident that in those periods (Intermediate and Late) metal working was in an advanced state and flint implements were no longer in demand' (Marshall 1931: 458). He also states that there may have existed 'a religious conservatism which required the use of the traditional stone knife at meals instead of the new fashioned metal ones', (ibid.: 36).

Mackay found less concentrations of stone tools in his excavations and states that 'No arrow-heads nor weapons of flint have as yet been found, and though this has been termed a Chalcolithic Civilization owing to the presence of these long flint flakes, copper and bronze had already practically ousted stone' (Mackay 1938: 395).

Our data, on the contrary, suggest that stone tools still remained an important part of the technological assemblage. Looking at some of the other contemporaneous Indus Period sites, we find more supportive evidence for this idea. At Kot Diji we have a site where the production of blades was a very important feature, possibly even for trade with other Indus Valley sites. Also at this same site, there appears to be an increase in multifunctional tools in the Mature Harappan phase (Cleland 1977: 100-101). Cleland suggests that this pattern may be due to changing economic activities, or may be due to bias in the sample, but it is probably not related to the introduction of a copper-bronze technology.

At Chanhu-daro, Mackay found several specialized stone tools, chert drills, made from blades; chert saws; polished polyhedral cores, which he calles 'burnishers'; and he also published what appears to be a crested blade (Mackay 1943: 211, 230; pl.XCII, 27, 28, 29; pl.LXXXVIa, 1, 2, 3a, 3b). We can see from our sample and from assemblages from other sites, that stone tools were by no means 'practically ousted', but that, in fact, there was a specific part of the technology where stone tools were indispensable.

Until we can undertake more detailed microscopic analyses of edge wear, we cannot make specific functional interpretations of the more common edge-damaged blades and flakes. It is possible that these tools had metal counterparts, but that being made of stone, they were more economical and in some cases probably more efficient. Marshall points out that 'it has been found by experiment that the sharp chert flakes cut steatite very well' (Marshall 1925-26: 86). The author's own experiments with chert

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

blades show that they are very effective for incising shell, and do not need to be resharpened so long as the incision does not go deep enough to pinch the edge of the blade. The outer surface of the conch shell is extremely hard, and even traditional steel tools used in Bengal for cutting and incising shell, must be repeatedly resharpened in the course of a day's work.

We could go on and cite many more examples of possible uses of stone tools where they would be more effective than metal tools, but our real goal must be to determine as precisely as possible, actual uses of these stone tools. We can accomplish this only if we have large samples of stratigraphically excavated materials which have been recorded, measured, and analysed with specific problems and hypotheses in mind. To supplement such analyses of archaeological materials, we also need to conduct technological and functional experiments using local cherts, which would be similar to those used at archaeological sites. As more studies of this nature are carried out, we can slowly begin to eliminate some of the conjectural statements in our discussion of the technology of the Indus Civilization and begin asking questions about the people who were using the tools.

ACKNOWLEDGEMENTS

I would like to thank Dr.G.F. Dales for providing me with the opportunity to study the lithics which he excavated from Mohenjo-daro in 1964-65, and I would also like to thank him and Dr.J.D. Clark for their comments and suggestions which were invaluable in the preparation of this report.

REFERENCES

Allchin, B. 1976. Paleolithic Sites in the Plains of Sind and their Geographic Implications. *Geographical Journal.* Vol. 142(3); 471-489.

———. 1979. Stone Blade Industries of Early Settlements in Sind as Indicators of Geographical and Socio-economic Change. In *South Asian Archaeology, 1977.* Naples. Vol. 1; 173-211.

Allchin, B., Gudie, A. and Hegde, K.T.M. 1978. *The Prehistory and Paleogeography of the Great Indian Desert.* New York. Academic Press.

Cleland, James H. 1977. *Chalcolithic and Bronze Age Chipped Stone Industries of the Indus Region.* Unpublished Ph. D. Thesis, Dept; of Anthropology, University of Virginia.

Dales, G.F. 1965. Preliminary Note on Excavations. *Archaeology.* Vol.18(2); 148-149.

———. 1966. The Decline of the Harappans. *Scientific American.* Vol. 214(5).

———. 1977. The Mohenjo-daro Floods Reconsidered. *Jour. of the Paleontological Society of India.* Vol.20;251-260 (for 1975 issue)

Gordon, D.H. and Gordon, M.E. 1940.Mohenjo-daro: Some Observations on Indian Prehistory. *Iraq.* Vol-.VII, 7. London.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro.* Vols. I & II. New Delhi.

———. 1943. *Chanhu-daro Excavations, 1935-36.* American Oriental Society. New Haven. C.

———. 1928-29. Excavations at Mohenjo-daro. *Annual Report of the Archaeological Survey of India;* 67-75.

Marshall, Sir John. 1925-26. Excavations at Mohenjo-daro. *A.R.A.S.I.*; 72-93.

———. 1931. *Mohenjo-daro and the Indus Civilization.* Vols.I, II & III. London.

Wheeler, Sir Mortimer. 1972. *Civilization of the Indus Valley and Beyond.* London 1966. New York: McGraw-Hill.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Table 13.1: Relaltive Frequencies of Colour and Texture in Chipped Stone Artefacts from Mohenjo-daro.

Colour	Texture Fine Number	%	Coarse Number	%	Total Number	%
GREY						
Plain	70		4			
Banded	17					
Mottled	3					
Mot.w/white	2					
Mot.w/brown	2					
Band.w/brown	5					
w/Black Dot	1					
Subtotal	100	86.95%	4	3.5%	104	90.%
BROWN-GREY						
Plain	6					
Banded	1					
Mottled	1					
Subtotal	8	6.95%	1	.9%	8	8.%
DARK-BROWN to RED-BROWN						
Plain	1					
Banded	1					
Subtotal	2	1.7%			2	2.%
Total	110	95.6%	5	4.4%	115	100.%

Table 13.2: Classification of Chipped Stone Artefacts From Mohenjo-daro; Comparison of Three Separate Studies of Different Samples.

	Dales '64-65			Allchin '76[1]			Cleland '75-76[2]			Total	
	No.*	No.	%	No.*	No.	%	No.*	No.	%	No.	%
Complete Blades		6	5.2		31	3.83		1	5.	38	4.06
Blade Fragments		95	82.6	647	657	81.21		7	70.	759	81.10
Reworked Blades				10							
Crested Blade/ Long. Trimming	1						1				
Bladelike Flakes		4	3.5		17	2.10		2	20.	23	2.45
with Cortex	1										
w/out Cortex	2						1				
Flakes w/Cortex	3	5	4.3		79	9.64	—	—	—	84	8.97
w/out Cortex	2										
Blade Cores				20							
Core Fragments		5	4.4	5	25	4.0	—	—	—	30	3.21
Cores in Prep.		—	—		1	.12		1	5.	2	.21
		115	100%		810	100%		11	100%	936	100.%

[1](Allchin, 1979:181) [2](Cleland, 1977:227, Table 1b)
(* We have combined some of the categories in order to prepare the comparative chart.)

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

TABLE 13.3 Mean Measurements and Morphological Types; Comparison With Mean Measurements*

BLADES	LENGTH mean	s.d.	WIDTH mean	s.d	THICKNESS mean	s.d	NUMBER of Cases	%	MEAN RATIO
Proximal Fragments	4.83	1.5	1.35	.35	.33	.12	30	26.1	
Cleland's Data	4.77	1.7	1.35	.41	.41	.13	583		
Midsections	3.64	1.17	1.31	.3	.32	.09	42	36.5	
Cleland's Data	4.16	1.59	1.3	.41	.37	.12	642		
Distal Fragments	4.49	1.32	1.03	.2	.36	.17	23	20.0	
Cleland's Data	4.77	1.72	1.34	.5	.40	.17	261		
(Total for Fragments)	4.32		1.23		.34		95		
(Cleland's Data)	4.5		1.33		.39		1486		
(Allchin's Data)	3.65		1.40		—		647		L:W mean s.d. W:T mean s.d.
Complete Blades	6.32	2.5	1.12	.5	.38	.22	6	5.2	1:.188 .08 1:.363 .16
Cleland's Data	5.59	1.96	1.29	.5	.43	.19	275		.47 .17 .33 .08
Allchin's Data	6.51		1.79		—		31		
BLADE CORES									W:L T:L
Double Platform	10.7		3.4		2.5		1	.9	1:4.03
Single Platform	5.3	2.7	2.9	.97	2.2	.98	4	3.5	1:2.7 .74 1:4.03 2.02
Cleland's Data	5.75	2.2	2.64	1.22	1.98	.96	171		2.4 .9 3.2 1.2
CRESTED BLADE	4.8	—	1.4	—	.8	—	1	.9	
BLADE-LIKE FLAKE w/Cortex	13.2	—	5.75	—	2.5	—	1	.9	
w/o Cortex	5.9	1.7	2.5	1.4	1.2	.14	2	1.7	
CORTEX FLAKE (10% or less)	3.66	.85	3.15	.45	.9	.2	3	2.6	
SECONDARY FLAKE	5.75	.2	4.0	.6	.65	.07	2	1.7	
TOTAL ARTEFACTS (In Our Sample) 115								100%	

* From Cleland's Indus Region Sample (1977, Table 4 & 3a) and Allchin's Sample from the Mohenjo-daro Museum. (1979: Table 2)
(N.B. The width measurement for our sample is the mean width of the blade.)

TABLE 13.4a: Relative Frequencies of Edge Damage Types on Each Edge of The BLADE and BLADE FRAGMENTS, including Retouched Tools.

FLAKING	EDGE DAMAGE: SLIGHT BOTH		HEAVY BOTH		HEAVY-R SLIGHT-L		HEAVY-L SLIGHT-R		HEAVY-R ONLY		HEAVY-L ONLY		SIGHT-R ONLY		SIGHT-L ONLY		TOTAL	
ONE EDGE D & V									1	1%	2	2.1%	2	2.1%	1	1%	6	
BOTH EDGES D & V	44	43.4%	16	16.5%	3	3%	5	5.2%									68	
L-D&V R-DORSAL	2	2.2%															2	
L-D&V R-VENTRAL					1	1%											1	
L-D&V R-UNDIST							2	2%									2	
L-DORSAL R-D&V	1	1%															1	
L-VENTRAL R-D&V	1	1%															1	
L-VENTRAL R-DORSAL			2	2.1%													2	
L-DORSAL R-VENTRAL			2	2.1%													2	
BOTH EDGES DORSAL RETOUCH	1	1%	2	2.1%													3	
BOTH EDGES VENTRAL RETOUCH			1	1%													1	
UNDIST.	7	7.2%															7	
TOTAL %	56	57.8	23	23.7	4	4.1	7	7.2	1	1.0	3	3.1	2	2.1	1	1.0	97	100%

Slight = Slight Edge Damage
Heavy = Heavy Edge Damage
R = Right Edge
L = Left Edge

Both = Both Lateral Edges
Dorsal = Flaking on Dorsal Face
Ventral = Flaking on Ventral Face
D & V = Flaking on Both Faces

Undist. = Undistinguishable

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

TABLE 13 4b: Relative Frequencies of Blade Morphological Types and Flake Types

BLADES	No.	%	FLAKES	No.	TOTAL	%
EDGE TOOLS			EDGE TOOLS			
Single Edge	6	6.25	Single Edge	1	8	7.7
Double Edge	86	88.75	Double Edge	1	88	85.5
Multifunctional			Multifunctional			
Borer & Edge Tool	1	1.0	Point and Edge Tool	1		
Notched & Edge Tool	1	1.0	Double Notched Flake	1		
Point & Edge Tool	1	1.0				
Side & End 'Scraper'	2	2.0			7	6.8
	97	100%			103	100%

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

14

R.H. Meadow

A Camel Skeleton from Mohenjo-daro

The most notable contribution of Sir Mortimer Wheeler to the archaeology of South Asia and the Middle East is the approach he advocated for the excavation and interpretation of ancient monuments based on an understanding of stratigraphy (Wheeler 1954; Harris 1975). This concern for the stratigraphic sequence led Wheeler to excavate at the two best known sites of the Indus Civilization, Harappa (in 1946) and Mohenjo-daro (in 1950), which previously had been extensively uncovered but whose complicated stratification had never been properly studied. Results of the work at Harappa were promptly published (Wheeler 1947); the excavations at Mohenjo-daro, however, have been reported only in the most summary fashion in the *Illustrated London News* (Wheeler 1950) and in supplements to the *Cambridge History of India* (Wheeler 1953, 1960, 1968). Wheeler's death in 1976 eliminated any chance of further elaboration by the excavator, but the decision by George Dales to present Wheeler's material together with the results of his own excavations at Mohenjo-daro (1964-1965) means that some details of the earlier work will be salvaged (Dales, in preparation).

One of the legacies of Wheeler's excavations at Mohenjo-daro is an archive of photographs and photographic negatives housed with Pakistan's Department of Archaeology in Karachi. While systematically reviewing the contents of this archive in 1979, George Dales discovered one frame depicting the meticulously excavated skeleton of a camel (*Camelus* sp.) lying largely within the confines of a 76 by 122 cm (2.5 by 4 foot) sounding dug in an area where three walls come together. This photograph, reproduced here forms the basis for the following discussion.

Almost no information about the photograph can be found. All that is known is Wheeler's negative number (1025) and the fact that it was taken at Mohenjo-daro during the 1950 campaign. The only other photograph in the Karachi archive with a closely related negative number (1026) is an overall view of clearing operations at the base of the citadel mound near the Granary early on in the excavation season (George Dales, personal communication). It seems likely, therefore, that the camel skeleton comes from this area, perhaps from one of those 'structures of poorer and poorer quality' which 'engulfed' the 'tall podium of the Great Granary on the western side of the citadel' (Wheeler 1968:127).

The immediate context of the camel skeleton is clear from Wheeler's excellent photograph and is outlined in more simplified fashion in **(fig. 14.1)**. The bones lie articulated on a surface which runs against (and which therefore was contemporary with) the two walls pictured in the lower left and lower right corners of the photograph and figure. The skeleton lies below a third wall built later than the other two and separated at its base from the lower left wall by a space of about 38 cm (15 inches). Contemporary with this later wall as well as with higher portions of the earlier walls is a living surface which covered the skeleton and into which a pottery vessel was sunk Apparently what happened in antiquity was that the body of a camel was dumped near the corner of a pre-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

sumably unused room or courtyard. The carcass was then covered with debris (including brickbats) and the area subseqently subdivided and inhabited.

Dividing up larger spaces into smaller units was characteristic of the late phase of occupation at Mohenjo-daro. According to Wheeler (1968: 127), 'houses ... were increasingly shoddy in construction, increasingly carved up into warrens.... Flimsy partitions subdivided the courtyards of houses .... Re-used brickbats tended to replace new bricks.' The bricks in the photograph have Harappan dimensions (c. 19 by 38 cm or 7.5 by 15 inches) but broken bricks seem to have been used particularly in later rebuilding and the faces of even the earlier walls are uneven.[1] All in all, the available evidence points to a date late in the Harappan period occupation of the site for the camel skeleton from Mohenjo-daro.

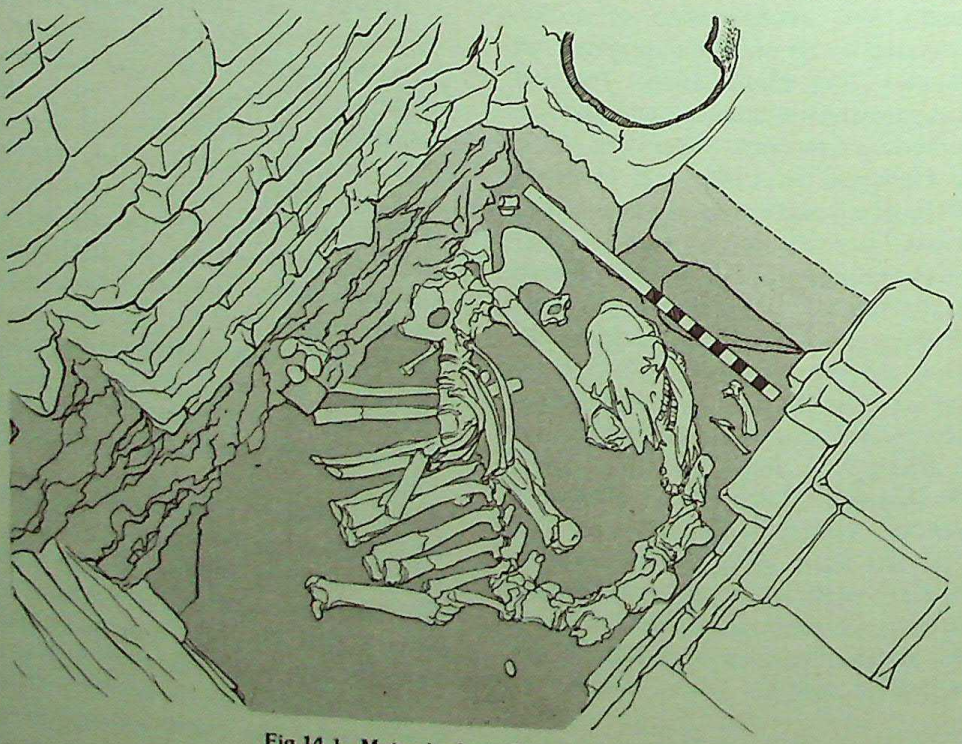


Fig.14.1. Mohenjo-daro: Camel skeleton

Turning now to consideration of the camel skeleton itself, the following elements are visible in the photograph and are outlined in **(fig. 14.1)**: complete cranium (excepting one premaxillary), mandible, 5 cervical vertebrae, 11 thoracic vertebrae, sacrum, 2 caudal vertebrae, 11 right ribs, 8 left ribs, right scapula, left humerus, innominate, right femur, and the distal epiphysis of the left femur. The atlas, axis, 1 thoracic vertebra, all lumber vertebrae, most caudal vertebrae, the remaining ribs, and the left scapula are most likely concealed by the exposed elements or not excavated. Evidently most of the lower limb bones were removed during the course of excavations and before the photograph was taken. In addition, the first rib of the right side and a premaxillary bone were removed during cleaning and placed in the corner of the excavation where they can be seen in the photograph just below one end of the two-foot scale.

Besides those specimens which are completely out of place, others including the skull and some ribs seem to have been removed, cleaned, and then replaced for the photograph in positions somewhat different from those in which they were originally found. When buried, the body of the camel lay on its left side with the neck arched dorsally over the back. Except for the unlikely possibility that the head was partially or completely severed from the neck, the cranium would originally have lain facing the rear of the animal **(fig. 14.2** for a possible reconstruction). As it is, however, the apparent repositioning of the skull has aided considerably in the identification of the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

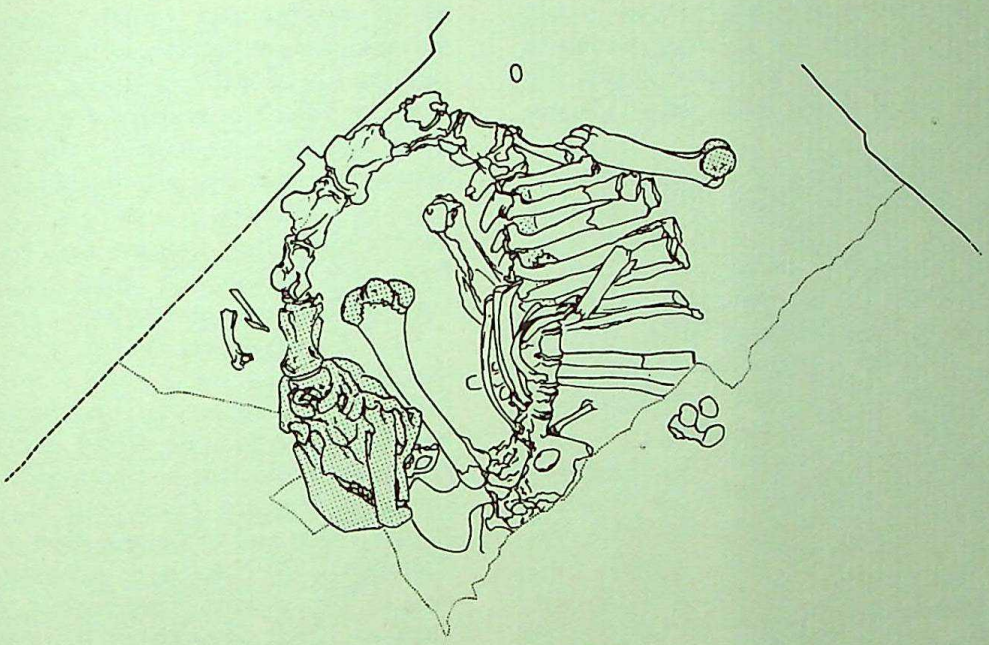


Fig.14.2. Mohenjo-daro: Camel skeleton

animal as camel and in providing information useful for determining its age at death.

The age of the camel at death is indicated by state of fusion of the long bones and stage of eruption of the teeth. The distal epiphysis of the humerus is the first articular end of a long bone to fuse to its diaphysis. In the photograph, that portion of the humerus is detached (and missing) and the roughened surface of the diaphysis is clearly visible, showing that fusion had not taken place. Furthermore, epiphyseal lines between the major bones of the left innominate are also vaguely visible, this indicating that fusion of those elements had not yet been completed. Evidently, the camel was quite young when it died. How young is suggested by the teeth. In the mandible the following teeth are visible: deciduous first, second, and third incisors, deciduous canine, both deciduous premolars, and the first permanent molar. According to data compiled by Silver (1969) for dromedaries, the deciduous canine erupts at 10-12 months and the first permanent molar by one year. From both teeth and long bones, therefore, an age estimate of about one year seems appropriate for the camel skeleton from Mohenjo-daro.[2]

An additional observation that can be made on the basis of the photograph is that the body of the young camel seems to have ended up in its final resting place at a time when *rigor mortis* either had not yet affected the body or had already passed off. This is evident from the positions of the limbs and particularly of the neck. The fact that the animal is as complete as it is, suggests that neither people nor scavenging beasts took the opportunity or had the chance to dismember the carcass. Burial very soon after death by individuals who did not care to consume the remains thus seems indicated. Cause of death and reasons for burial and not consumption, however, are aspects of this story which remain hidden. Without them, further speculation lacks all foundation.[3]

The domestic camels of South Asia today are dromedaries. This may not have been the case in the past, however. Camel bones have been recovered from beds in Siwalik Group formations dating perhaps to the Middle Pleistocene. *Camelus antiquus* Lydekkar 1885 and *C.sivalensis* Falconer and Cautley 1836 are the two forms identified (Badam 1979). Descendants of these aboriginal forms may have survived into the Holocene in arid areas of the subcontinent. If they did survive, however, there is presently no fossil or sub-fossil evidence for it. The next camel remains known to us from South Asia are those of the Harappan period, namely the specimens reported by Sewell (1931: 660) and the present author (here) from Mohenjo-daro, by Prashad (1936: 58-59) and Nath (1962) from Harappa, and by Thapar and Lal (1969: 38) from Kalibangan. Particularly given the securely dated evi-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

dence from Kalibangan (which, however, is only mentioned in passing), it is no longer possible to doubt the presence of the camel during the Harappan period in the Indus Valley (Zeuner 1963: 349).

The few camel bones from Mohenjo-daro and Harappa described by Sewell (1931), Prashad (1936), and Nath (1962) were identified as *'Camelus dromedarius?'* primarily on the basis of comparison with a single dromedary skeleton in the collections of the Zoological Survey of India. While qualitative osteological differences between bactrian and dromedary camels can be found (Lesbre 1903; Compagnoni and Tosi 1978; Paula Wapnish, personal communication), these clearly were not sought when the Mohenjo-daro and Harappa material were identified. The only valid course, therefore, is to ignore such specific identifications. In the case of the Mohenjo-daro skeleton reported here, should the bones be found amongst the reserve collections in Pakistan, determination of species might be possible from the skull and limb bones even though the animal was quite young when it died. In the meantime, identification is possible only to the genus level (*Camelus* sp.).

To the west of the Indus Valley, camels were being exploited at least as early as the fourth millennium B.C. In Turkmenia, camel bones and camel figurines have been found in Namazga IV contexts (early third millennium; Masson and Sarianidi 1972, Ermolova 1968, 1970) with skeletal remains coming from even more ancient levels at Anau (Duerst 1908). The figurines reportedly all represent the two-humped species and the bones are identified as coming from *Camelus bactrianus*. From mid-third millennium levels at Shahr-i Sokhta in Iranian Siestan, camel bones, hair, and dung have been found. On the basis of details of bone morphology, Compagnoni and Tosi (1978) suggest that the specimens from Shahr-i Sokhta come from bactrian camels.

Closer to the Indus Valley, from Pirak in the northern Kachhi Plain, camel bones and figurines have been recovered in second and first millennium B.C. deposits (Jarrige, Santoni, and Enault 1979; Meadow 1979). The older levels at Pirak (Period I) may date as early as 2000 B.C., and even a more conservative dating of 1700 B.C. places the site within the Harappan period, albeit near the end. The camel bones from Pirak have not been analyzed in detail, but the figurines are all of two-humped camels.[4] Some of these figurines are painted in such a fashion as to suggest the use of textile coverings over the humps, body, and neck or perhaps even saddles. Some specimens have transverse holes through their noses and lower legs presumably for the attachment of a nose peg or a string and wheels. Such modifications may indicate that the people of Pirak were familiar with camels used for hauling loads, pulling carts, and perhaps even riding.

Pirak is located near the foot of the Bolan Pass and thus is on a major route from Sind to the highlands of Afghanistan, the Iranian plateau, and Central Asia. The recent discoveries of a Harappan settlement at Shortugai on the Amu Darya in northern Afghanistan (Francfort and Pottier 1978) and of Central Asian-type (Period Namazga V-VI) material in graves at Mehrgarh, also in the northern Kachhi Plain (Jarrige and Meadow 1980), show clearly that there were direct lines of communication and perhaps even the movement of groups of people throughout the highland area and into the margins of the lowlands during the late third and early second millennium B.C. Furthermore, evidence from the earlier periods at Mehrgarh demonstrate that such interactions had been taking place at one level or another from at least as early as the sixth millennium B.C. (Jarrige and Lechevallier 1979; Jarrige and Meadow 1980; Lechevallier and Quivron, 1981; Jarrige, in press). In the faunal and artifactual assemblages from Mehrgarh, however, neither camel bones nor camel figurines have yet been identified (Meadow, in press).

The available information, therefore, seems to indicate that camels of the bactrian type were introduced into the greater Indus Valley from the highlands during the late third or early second millennium B.C. As noted previously, the species of camel present at Mohenjo-daro, Harappa, and Kalibangan remains in doubt. Given the situation on the western borderlands, however, in all probability these Harappan period camels were the two-humped form. In fact, as Richard Bulliet points out, not until the end of the first millennium A.D., was the dromedary of any significance on the South Asian subcontinent. All earlier evidence points to the exclusive use of bactrian camels in the area (Bulliet 1975:188).

The bone remains from Mohenjo-daro, Harappa and Kalibangan indicate that camels were known and probably kept in the Indus Val-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ley during the Harappan period. The absence of a tradition of depicting camels in seals or as figurines, however, suggests that these animals were of a different order of cultural or economic importance to at least most of the inhabitants of those sites. This situation stands in marked contrast to Pirak and to the sites of Turkmenia. The principal uses of the camel are for hauling, draft, and transport, all functions which can be carried out by bovines. To judge from both faunal remains and representations, the water buffalo and particularly zebu cattle were of primary cultural and economic importance during the Harappan period in the Indus Valley and have continued to be so up to the present day (Meadow 1979a). Camels, however, are particularly useful to nomads and to traders who periodically need to transport household belongings or goods over long distances and/or through marginal areas with only limited pasturage. In this regard, Jarrige *et al* note:

> As for the camel, it alone made it possible to put into practice on a large scale a system of seasonal migrations on which the complementary economy of the highlands and lowlands was based. If the movement of populations between the plains and the mountains in the 4th and 3rd millennia played a role of some importance, the absence of a pack animal such as the camel limited its scale. Let us remember that nowadays these migrations that go together with the transport of considerable quantities of cereals necessitate the employment of thousands of camels. (Jarrige, Santoni, and Enault 1979: 405).

Closer to the Indus Valley, from Pirak in the northern Kachhi Plain, camel bones and figurines have been recovered in second and first millennium B.C. deposits (Jarrige, Santoni, and Enault 1979; Meadow 1979). The older levels at Pirak (Period I) may date as early as 2000 B.C., and even a more conservative dating of 1700 B.C. places the site within the Harappan period, albeit near the end. The camel bones from Pirak have not been analyzed in detail, but the figurines are all of two-humped camels.[4] Some of these figurines are painted in such a fashion as to suggest the use of textile coverings over the humps,

The introduction of the camel to the Indus Valley, therefore, could be a reflection of important changes in social and economic patterns which were taking place in the western borderlands during the late third and early second millennia B.C. Certain segments of the populations at major Indus Valley centres may, in fact, have kept camels for transport or trading purposes. In spite of their seemingly uniform cultural remains, these Harappan period sites were almost certainly not inhabited by a single group to the exclusion of peoples with strong ties to borderland or highland regions. And one suspects that to learn something of the nature of the interactions between these different peoples is to come to a better understanding of the reasons for changes in the greater Indus Valley during the mid-second millennium B.C.

In conclusion, it is well to note that the camel skeleton from Mohenjo-daro is an exceptional find, a photograph existing only because of its unusual nature. How common are camel remains at Mohenjo-daro? What is their distribution both temporally and spatially within the site? These questions have no answer because comprehensive collections of faunal remains have never been made at this site nor at Harappa. Most South Asian archaeologists, however, are now aware that 'bones are documents as are potsherds and demand the same scrupulous attention both on the site, in the small-finds shed, and in the laboratory' (Wheeler 1954:164). Scrupulous attention in the future to these words of Sir Mortimer Wheeler should provide us with much valuable faunal material with which to begin to answer some of the questions raised in this essay.

ACKNOWLEDGEMENTS

The author expresses thanks to George F. Dales and to the Department of Archaeology, Government of Pakistan, for making the photograph available. Enhancement of detail in the original print was successfully undertaken by Hillel Burger of the Peabody Museum, Harvard University. The figure was drawn by Margaret Estey of the Museum of Comparative Zoology.

NOTES

1. Only bricks as close as possible to two-foot (61 cm) scale can be measured. Brick heights are not determinable because of distortion due to the camera angle. Given the re-use of Harappan period bricks even up to the modern era, a post- Harappan date, while unlikely, cannot be completely ruled out.

2. Epiphyseal union and tooth eruption may occur at different ages in the bactrian camel but the author has not been able to uncover any information on this subject.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

3. It is perhaps worth noting that camel is eaten in Pakistan today. While assisting in the excavation of the site of Balakot near Sonmiani in 1975, the author was able to observe a lame camel being slaughtered, butchered, and distributed amongst the local population.

4. The female 'dromedaire' with four teats illustrated as Figure 94:627 and Plate XLIIIB of Jarrige, Santoni, and Enault (1979) has its single diminutive hump too far forward on its elongated body to be a convincing representation of a dromedary.

REFERENCES

Badam, G.L. 1979. *Pleistocene Fauna of India.* Pune. Deccan College Postgraduate and Research Institute.

Bulliet, R.W. 1975. *The Camel and the Wheel.* Cambridge: Harvard University Press.

Compagnoni, B. and Tosi, M. 1978. The camel: its Distribution and State of Domestication in the Middle East during the Third Millennium B.C. in Light of Finds from Shahr-i Sokhta. In *Approaches to Faunal Analysis in the Middle East.* 91-103. Cambridge: Peabody Museum Bulletin 2.

Dales, G.F. *Mohenjo-daro Excavations: 1964-65 and 1950.* Philadelphia. University Museum (in preparation).

Duerst, J.U. 1908. Animal Remains from the Excavation at Anau and the Horse of Anau in its Relation to the History and to the Races of Domesticated Horses. In *Explorations in Turkestan, Expedition of 1904.* R. Pumpelly ed. 341-442. Washington.

Ermolova, N.M. 1968. Kostnye ostatki mlekopitajushchih iz poselenij epohi eneolita i bronzy Juzhnogo Turkmenistana. *Karakumskie Drevnosti* 1. 48-53. Ashkhabad.

———. 1970. Novye materialy po izucheniju ostatkov mlekopitajushchih iz drevnih poselenij Turkmenii. *Karakumskie Drevnosti.* 3; 205-232. Ashkhabad.

Francfort, H.-P. and Pottier M.H. 1978. Sondage Préliminaire sur létablissement proto-historique harappeen et post-harapeen de Shortugai (Afghanistan du N.E.). *Arts Asiatiques.* No. 34; 29-86.

Harris, E.C. 1975. The Stratigraphic Sequence: a Question of Time. *World Archaeology.* No. 7, 1; 109-121.

Jarrige, J.F. 1981. Economy and Society in the Early Chalcolithic/Bronze Age of Baluchistan: New Perspectives from Recent Excavations at Mehrgarh. In *South Asian Archaeology 1979.* H. Hertel ed. Berlin.

Jarrige, J.-F. Enault, J.-F. and Santoni, M. 1979. *Fouilles de Pirak.* 2 vols. Paris: Diffusion de Boccard.

Jarrige, J.F. and Lechevallier, M. 1979. Excavations at Mehrgarh, Baluchistan: Their Significance in the Prehistorical Context of the Indo-Pakistani Borderlands. In *South Asian Archaeology 1977.* M. Teddie ed. Vol.1; 463-535. Naples. Istituto Universitario Orientale, Seminario di Studi Asiatici.

Jarrige, J.F. and Meadow, R.H. 1980. The Antecedents of Civilization in the Indus Valley. *Scientific American.* No. 243; 2.

Lechevallier, M. and Quivron, G. 1981. The Neolithic in Baluchistan: New Evidence from Mehrgarh. In *South Asian Archaeology 1979.* H. Hertel ed. Berlin.

Lesbre, M.F.-X. 1903. Recherches anatomiques sur les camelides. *Archives du Musee d'Histoire Naturelle de Lyon.* 8; 1-195.

Masson, V.M. and Sarianidi, V.I. 1972. *Central Asia: Turkmenia before the Achaemenids.* London: Thames and Hudson.

Meadow, R.H. 1979. A Preliminary Note on the Faunal Remains from Pirak. In *Fouilles de Pirak.* J.F. Jarrige, J.-F. Enault, and M. Santoni ed. Vol.1; 334. Paris, Diffusion de Boccard.

———. 1979a. Prehistoric Subsistence at Balakot: Initial Consideration of the Faunal Remains. In *South Asian Archaeology 1977.* M. Teddie ed. Vol.1; 275-315.

———. 1980. Early Animal Domestication in South Asia: a First Report of the Faunal Remains from Mehrgarh, Pakistan. In *South Asian Archaeology 1979.* H. Hertel ed. Berlin.

Nath, B. 1962. Remains of Horse and Indian elephant from Prehistoric Site of Harappa. *Proceedings, 1st All India Congress of Zoology.* 2; 1-14. Calcutta.

Prashad, B. 1936. *Animal Remains from Harappa* Memoirs of the Archaeological Survey of India. No.51.

Sewell, R.B.S. 1931. Zoological Remains. In *Mohenjo-daro and the Indus Civilization.* J. Marshall ed. 649-673. London.

Silver, I.A. 1969. The Ageing of Domestic Animals. In *Science in Archaeology.* D. Brothwell and E. Higgs ed. 2nd edition; 283-302. London. Thames and Hudson

Thapar, B.K. and Lal, B.B. 1969. Excavation at Kalibangan, District Ganganagar. *Indian Archaeology 1964-65 — A Review.* 35-39. New Delhi. Archaeological Survey of India.

Wheeler, Sir R.E.M. 1947. Harappa 1946: the Defenses and Cemetery R37. *Ancient India.* No. 3; 58-130. New Delhi.

———. 1950. Preliminary Reports on Excavations at Mohenjo-daro. *Illustrated London News* for May 20; 782-783; May 27: 813-816; June 3: 854-855.

———. 1953. *The Indus Valley Civilization.* Cambridge University Press.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

———. 1954. *Archaeology from the Earth*. Oxford; The Clarendon Press.
———. 1960. *The Indus Valley Civilization*, 2nd edition. Cambridge University Press.
———. 1968. *The Indus Valley Civilization*, 3rd edition. Cambridge University Press.
Zeuner, F.E. 1963. *A History of Domesticated Animals*. London. Hutchinson & Co.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

15

V.B. Mainkar

Metrology in the Indus Civilization

A remarkable feature of the Indus Civilization is the accuracy and uniformity of denominations, shapes and types of weights discovered in the vast region—measuring some 1600 kilometres from east to west and 1100 kilometres from north to south. This accuracy and uniformity was observable over a period of about 1000 years. Such uniformity of weights over such vast spans of distance and time is a unique feature in the history of metrology. What strikes the student of history of science is that such uniformity of the system of weights did not obtain at the dawn of history of this subcontinent. The later millennia witnessed a chaos of systems of weights and measures in this country; they varied from place to place, market to market and even from commodity to commodity. The chaos which prevailed for 2000 years was abolished by the adoption of the metric system of weights and measures only recently (Standards of Weights and Measures Act 1956). The available specimens of weights found in the various sites of the Indus Civilization are in abundance; however, of the measures of length, area and volume, very few specimens are available.

It would be interesting to analyse the system of Indus weights and measures in the light of the general conditions existing in the rest of the world at that time, as also to find out how, and to what extent, it affected the systems that were in use in India later on. For the purpose of this analysis, it may be assumed that the Indus Civilization began its settlements about 2500 B.C. and that its final destruction took place around 1500 B.C.—a period of about 1000 years (Rao 1973).

In the known world of those times, the Egyptian and the Sumerian (or Mesopotamian) civilizations were also well developed. The Greek and other civilizations had not yet become influential. The available information (Berriman 1953) shows that there were many systems of weights and measures prevalent in Egypt, and there was no uniformity in them even remotely comparable with that noted in the Indus valley. The Sumerians also could not claim comparable uniformity in the field of weights and measures. Even the shapes of the weights used in the Egyptian and Sumerian civilizations were entirely different. Some Sumerian weights were made in the shape of animals. The shapes of the Indus weights were highly practical. It is, therefore, unlikely that the Egyptian or Sumerian civilizations had any lasting influence on the system of weights and measures used in the Indus Civilization. The reverse of it may be nearer the truth.

It is safe to conclude that the very stability and durability of the uniform system of weights and measures in the Indus Civilization may have had some influence on later civilizations in India. It might, therefore, be of interest to study the unique system of weights and measures which was prevalent in the Indus Civilization and to ascertain the relation, if any, it had with the systems of weights and measures mentioned in the Vedas and those used in periods immediately after the Indus Civilization came to an end.

WEIGHTS

Hemmy (in Mackay 1938) in his analysis of the weights discovered at Mohenjo-daro and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Harappa, noticed certain peculiar features. His table, with some variations, includes many of the weights discovered by Rao at Lothal many years after the compilation of Hemmy's table. The main denominations of weights listed in Hemmy's table based on the mean weight in grammes and the ratio are given in Table 15.1.

TABLE 15.1: DENOMINATIONS OF WEIGHTS IN MEAN WEIGHT

Mean Weight (grammes)	Ratio
0.871	1
1.770	2
2.285	8/3
3.434	4
6.829	8
13.731	16
27.405	32
54.359	64
136.02	160
174.50	200
271.33	320
546.70	640
1417.5	1600
2701.4	3200
5556.0	6400
6903.0	8000
10865.0	12800

The accuracy of the weights was high. The deviation was 0.026 g in the case of the weight of 0.871 g; 0.206 g in the case of 13.731 g and 0.785 in the case of 136.02 g. The lower and upper limits of weights were 0.813 g and 0.928 g, 13.079 g and 14.940 g, and 134.59 g and 137.81 g.; The deviation in the case of 13.791 g is about 1.5 per cent. Considering that the weights are very old and might have undergone some deterioration, the deviation is negligible.

Rao (1973) discovered several weights at Lothal. The smallest weight has a mean mass of 1.8233 g. Mean values of the other weights were 3.448 g, 5.172, 6.896 g, 13.792 g, 27.584 g, 55.168 g, and 137.90 g. Except for the weight of 5.172 g, the weights occur with slight variations in Hemmy's Table.

Rao (1973) also found a second set of weights at Lothal which had a truncated spheroidal shape. The smallest weight in this series was 1.2184 g, and the other weights were 4.3370 g, 8.5753 g, 18.1650 g and 33.3052 g. These denominations have ratios of 7/2, 7, 14 and 28 in terms of the weight of 1.2184 g. Rao feels that as the weight of 8.575 g is nearly equal to the *shekel* of Susa (8.37 g), these weights were perhaps used for international trade.

The series of weights tabulated by Hemmy falls into a table which is partly binary and partly decimal. Hemmy, however, assumed that the smallest weight of 0.871 g was the unit weight, which is not logical. The second set of weights discovered by Rao which falls outside Hemmy's table, is binarily arranged. This classification of Indus weights into partly binary and partly decimal systems does not appear to be logical and perhaps does injustice to the practical and logical people of the Indus Civilization.

The practical approach would appear to be to take all these weights together and divide them afresh into two or more logical groups. It is obvious, to any observer that the decimal system is primarily used in the progression of the Indus weights. The principle used for the progression of the denominations of the metric weights is to multiply and divide the decimal unit by two. For example, take the unit of 100 g. By multiplying it by two, we get 200 g; dividing it by two gives 50 g. If the same operation is repeated with other decimal units the series of denominations obtained is 1, 2, 5, 10, 20, 50, 100, 200, 500 and so on. Thus the weights form a series in the ratio of 1:2:5 and decimal multiples of each of the numbers in this ratio. Applying this principle to the totality of the weights recorded by Hemmy and discovered by Rao, two distinct and well-knit series of denominations are obtained, as shown in Tables 15.2 and 15.3.

Table 15.2: First Series of weights

Mean Weight (approx.)	Ratio (approx.)	Gunja (109 mg.)
1.2184	0.05	12
2.285	0.1	24
5.172	0.2	48
13.792	0.5	120
27.584	1	—
55.168	2	—
137.90	5	—
271.33	10	—
546.70	20	—
1417.5	50	—
2701.4	100	—
5556.0	200	—
10865.0	500 (?)	—

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Table 15.3: Second series of weights

Mean weight	Ratio (approx.)	Gunja (109 mg)
0.871	0.05	8
1.770	0.1	16
3.434	0.2	32
8.5753	0.5	80
18.1650	1	160
33.3052	2	320
174.50	10	—
6903	500 (?)	—

These two tables leave out only two weights of 6.829 grammes (or 6.896 grammes of Rao) and 4.3370 grammes, which happen to be approximately a quarter of 27 405 grammes and 18.165 grammes respectively and may have been used for special purposes. These two tables are formulated by the application of the same logical principle as has been used 4000 years later in the progression of the denominations of weights of the metric system.

It may also be noted that the weights of ratio unity in the two tables are rationally related to each other. The unit weight of 27.584 grammes of the first series, is 50 per cent higher than the unit weight of 18.1650 grammes of the second series.

The number of *gunjas* in some of the smaller denominations is included in the tables for explaining what is to be presented later in this paper.

When thus tabulated, the weights fall into two near series. The first series, which constitutes the major series, appears to have been used generally for internal transactions within the territory occupied by the people of the Indus Civilization. The second series may have been used for weighing export commodities, as indicated by Rao, but there is evidence, in later history, to show that the weights included in the second series were used in India and may, therefore, have an indigenous origin.

There are usually two basic weights in a series of weights, a lower unit weight and a higher unit weight. The lower unit weight is useful for weighing small quantities of precious commodities like gold, silver, diamonds, pearls, precious stones, precious materials, etc.; while the higher unit weight is useful for weighing larger quantities of commodities used in daily transactions involving purchases of foodgrains, groceries and other goods. The *tola* was, for example, the basic lower unit weight and the *seer* the higher. The grain and pound, the gramme and the kilogramme are other examples. Among the weights discovered in the Indus Civilization, the weight equal to 27.584 grammes in the first series, appears to be the lower unit weight, while 546.70 grammes or 1417.5 grammes appears to be the higher unit weight.

The reasons for selecting these unit weights are numerous. The more important for these are as follows.

[i] If the first series of weights is examined carefully, it will be seen that if 27.584 grammes is taken as the lower unit weight, the smaller denominations are in decimal division of this unit, the smallest weight discovered being 0.05 times the lower unit weight. Above this, the lower unit weight, the multiples increase in the ratio of 1, 2, 5, 10, 20, 50, 100, 200, 500 and so on.

[ii] The neatness with which the weight of 27.584 grammes explains the denominations of the first series of weights, makes it probable that it was the lower unit weight.

[iii] the higher unit weight is a matter of conjecture. Normally, the higher unit weight is a large multiple of the lower unit weight, for example, 80:1 in the *seer-tola* series, 7,000:1 in pound-grain series, and 1,000:1 in kilogramme gramme series. It is also essential that the higher unit weight should be such that it can be handled easily for purposes of transactions. It should not, therefore, be too heavy. A weight exceeding 2 kg may be, for example, too large. It would, therefore, appear that the proportion in the case of Indus weights should be 20:1 or 50:1, that is, the higher unit weight should be 546.70 grammes or 1417.5 grammes.

[iv] The weight of 18.165 grammes appears to be the lower unit weight in the second series. The higher unit weight would be 336.33 grammes or 908.25 grammes on the analogy of the first series of weights.

The corroboration of the theories advanced above is not possible, because specimens of materials which are known to have been weighed with these weights are not available. In the case of length, sizes of bricks, houses, doors, docks, etc. are used for corroborating the validity of the length measures, but in the series of weights, this facility is not available.

It is now possible to study whether Vedic and later weights had any relation with the Indus weights. In Vedic literature references to the words *krishnala, mashaka, nishka, pala,* etc.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

occur frequently but a table of their inter-relation is not recorded anywhere as done in later literature.

The *Arthasastra* generally considered to have been composed in the fourth century B.C. by Kautilya is the main source of reliable information about weights and measures. The empire of the Mauryas spread over substantial portions of the territories occupied by the Indus Civilization and was also close to it in historical terms. An analysis of the information contained in the *Arthasastra* may prove useful.

The *Arthasastra* prescribes a different series of weights for gold, silver and diamonds.

(a) The series of weights recommended for weighment of gold is:

10 *dhanya mashaka* or 5 *gunja*	=	1 *suvarna-mashaka*
16 *suvarna-mashaka*	=	1 *suvarna or karsha*
4 *karsha*	=	1 *pala*

(b) The series of weights recommended for weighing silver is:

88 *gaur-sarshapa*	=	1 *rupya mashaka*
16 *rupya mashaka* or 20 *shaimbya*	=	1 *dharana*

(c) The series of weights recommended for weighing diamonds and precious stones is:

20 *tandula*	=	1 *vajra-dharana*

The weights were made in following denominations:

Mashaka	=	½, 1, 2, 4, 8
Suvarna	=	1, 2, 4, 8, 10, 20, 30, 40 and 100

The *dharana* also had similar denominations. It is further laid down that one *pala* is equal to 10 *dharana*, and

100 *pala*	=	measure for revenue,
95 *pala*	=	measure for trade,
90 *pala*	=	measure for payment,
85 *pala*	=	measure for palace stores.

The pala is less by half a *dharana* in each case. Further,

200 *pala of dhanya mashaka*	=	*drona* for revenue,
187½ *pala of dhanya mashaka*	=	*drona* for trade,
175 *pala of dhanya mashaka*	=	*drona* for payments,
162½ *pala of dhanya mashaka*	=	*drona for palace stores.*

It has been laid down that weights should be made from stone or metal. It is not clear what the shape should be, but the superintendent of weights and measures was expected to get such weights manufactured by setting up factories for the purpose. Every weight and measure was verified and stamped after four months.

The 'unit of weight' called the *gunja*, occurs in the *Arthasastra* table indicated above. The *gunja* has created much confusion in the examination of the ancient weights and measures in India. The *'gunja'* is on par with the *'grain'* in the pound series. It seems a little difficult to believe that, in ancient times people started with a lower base unit like the *gunja* which was so small and so obviously variable in weight under climatic conditions. To imagine that the peasants and intellectuals of ancient times did not understand this fact would do injustice to their wisdom.

The *gunja* appears, to the metrologist, to be an equilibrium and not a real weight. Even today, the practice observed in weighing gold is to weigh it accurately to the 'rounding' unit approved by trade practice. The *gunja* served generally as the rounding unit, i.e. when the masses of weights and the gold being weighed are almost balanced, the placing of one *gunja* seed on the weights pan tilted the balance to the heavy side and its removal tilted it to the lighter side. This was the correct weight of the gold to the nearest *gunja*. The variation introduced by this practice was not substantial, being of the order of the difference between the weight of one *gunja* seed and another, which means a few milligramms, unless malpractices were used, like stuffing the gunja seed with lead. Even if more than one *gunja* seed was used, the difference between their weights did not introduce a substantial error in the actual weighment.

Many experiments carried out by the author on the average weight of the *gunja* seed over the course of more than one year, have shown that the weight of *gunja* seeds varies from seed to seed and in the case of the same seed, with the climatic conditions and the age of the seed. The weight of the *gunja* seed varied between 105 and 125 milligrammes, with a general average around 110 milligrammes.

The only weight in the *Arthasastra* series of weights about which some information is available is the *gunja*, which is so variable. Further, not a single specimen, either in metal or stone of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

any *Arthasastra* weights is available. To compare the *Arthasastra* weights with Indus weight, we may, therefore, assume an arbitrary weight for the *gunja*. The smallest weight in the Indus series is 0.871 g. An arbitrary weight of 109 mg may be selected for the *gunja*, so that 8 *gunja* will be equal to the smallest Indus weight (0.871 g) This weight of 109 mg for the *gunja* seed is also close to the general average indicated above.

The values of *Arthasastra* weights for gold would then be as given below:

1 *Suvarna-mashaka*	= 0.545 g. (5 *gunja*)
1 *karsha*	= 0.545 × 16 = 8.720 g. (80 *gunja*)
1 *pala*	= 8.720 g × 4 = 34. 880 g. (320 *gunja*)

Since 10 *dharana* are equal to one *pala*, the *dharana* equals 3.488 g which is easily comparable with the weight of 3.434 g in the Indus series. The *dharana* weight is equal to 32 *gunja* as the *pala* is equal to 320 *gunja*. The Indus weights of 33.3052 grammes and 3.434 grammes are obviously equal, more or less, to the *pala* of 34.880 grammes and the *dharana* of 3.488 grammes. As these two *Arthasastra* weights are related to the weighment of gold and silver, there is sufficient ground to believe that the second series of Indus weights was used for similar weighments. This also explains why there are much fewer high denominations in the second series of Indus weights than in the first series.

This weight of 3.488 g has an extremely important place in numismatics. The weight of the punch-marked coins, belonging to a period roughly from the fourth century B.C. to the first century A.D., was known to vary between 3.3 g and 3.6 g, the preponderant number of coins having a weight of about 3.45 g. Further, these coins were also said to be equal to 32 *gunja*, which agrees exactly with the equivalence of the *dharana*.

It is clear from appendix I, in which a note specially written by Miss Vanaja for this paper is reproduced, that some of the punch-marked coins bear marks which are similar to those on the Indus seals. Thus, the weight of the punch-marked coins and some of the weights of the *Arthasastra* series can be related directly with the Indus weights.

The denominations in which the *Arthasastra* weights were made, shows that the *suvarna* series of weights ranged from 1 *suvarna* to 100 *suvarnas*. The weight of one *suvarna* (0.545 grammes) would be the weight just below that of 1.2184 grammes, while the weight of 100 *suvarnas* is equal to 54.5 g which compares favourably with the Indus weight of 55.168 grammes in the first series.

The *karsha* of the *Arthasastra* (8.720 g) appears to be related to the weight of 8.575 g in the second series of Indus weights, (see Table 16.3) and the *drona* of revenue (200 *pala*), equal to 6976 g is comparable to the Indus weight of 6903 g.

It is thus seen that the Indus weights and the *Arthasastra* weights were closely related, and perhaps had a common origin. the decimal progression of the Indus weights is, however, not so strongly visible in the *Arthasastra weights*, though it is not altogether absent. The *Arthasastra* weights are also, by no means, binary in character.

The *Manusmriti* (Acharya 1946) also records a series of weights for weighing gold, silver, etc. which are substantially similar to those described in the *Arthasastra*. Starting with *krishnala* (which is another name for the *gunja*), the *Manu-Smriti* weights are as follows:

The similarities between the series of weights in *Manusmriti*, the *Arthasastra* and the Indus weights would be apparent from the above table of values. There is reason to believe that the two systems of weights used later in India had perhaps a common origin which can be traced directly to the Indus Civilization.

The lower unit weight of 27.584 grammes would remind us of the English ounce which in turn was related to the Greek *uncia* of about 27.2 grammes (Berriman 1953). The Greek civilization had not even begun at the time when the Indus Civilization flourished, and it is not difficult to believe that the Greek uncia was, perhaps, modelled on the weight of 27.584 grammes used in the Indus Civilization. The Greeks, of course, did not use the decimal progression for a variety of reasons.

The logical use of the decimal system reminds us of Chapter 17 verse 2 of the *Yajurveda* wherein the decimal multiples from 1 to 10 are enumerated. This point also suggests that the similarities between the Vedic civilization and Indus Civilization, noted particularly from the inscriptions of the Indus seals which were not as

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

fortuitous as they may appear at first sight.

Further research is, however, necessary to probe these matters further and, in relation to the history of metrology in India, may have to be related with the metrology of the Indian coins in the absence of specimens of actual weights used in later periods in India.

Length Measures

The main evidence with regard to length-measures is the discovery of three incomplete scales, one each at Mohenjo-daro, Lothal and Harappa.

The Mohenjo-daro specimen is a part (broken) of a scale made of shell (Mackay 1938). It has nine graduations and there is a hollow circle on one graduation, while on the fifth graduation therefrom, there is a large circular dot. This sequence would indicate that a hollow circle would occur five graduations after the dot and so on. The graduation lines are made with a fine instrument and are uniformly thick and properly graded in length. The distance between two adjacent graduation lines is, on an average, 6.7056 mm. The accuracy of the graduations is very high, as the mean error of graduation is 0.075 mm. Thus, the length contained between five graduations is 33. 528 mm and the length between one hollow circle and the next would be 67.056 mm. This length of 67.056 mm apparently constitutes the major graduation of the scale.

Since the sub-division of the major graduation of the scale is decimal, we may reasonably assume that the original scale had ten major graduations on it. This assumption leads us to the conclusion that the length of the total scale was 670.56 mm. This is a very interesting result, as the total length of the scale is practically equal to two-thirds of a metre. It is also noteworthy that the length-scale appears to be decimally divided like the metre. It will be recalled that the series of weights was also shown earlier to be graded decimally. This scale may be referred to as the Mohenjo-daro scale.

An ivory scale, again a truncated piece, was found at Lothal (Rao 1973). The Lothal scale is 15 mm broad, 6 mm thick and has a length of 128 mm. Only 27 graduation lines can be easily seen, the length over which these lines are spread, being 46 mm. The average distance between the graduation lines is, therefore, 1.704 mm. The sixth and the twenty first graduation lines are longer than the rest. The length between these two graduation lines is, by calculation, 25.56 mm. The scale may be referred to as the Lothal scale.

A piece of bronze rod (Vats 1953) with 4 graduation lines, each at an interval of 9.34 mm was found in Harappa. This scale may be called the Harappa scale. The length of ten such graduations would be 93.4 mm. This length appears to be a combination of the major graduations of the Mohenjo-daro and Lothal scales, namely, 67.056 mm plus 25.56 mm = 92.616 mm.

There is little further evidence of any other length-measure. The Mohenjo-daro scale and the Lothal scale are apparently different but on analysis they prove to be practically equal. It will be noticed that 20 divisions of the Lothal scale are equal to 34 mm, which is almost equal to the distance between the hollow circle and the circular dot on the Mohenjo-daro scale, namely, 33.53 mm. This fact establishes that the two scales are related, but their division into smaller graduations is different. The smaller graduations of the Mohenjo-daro scale are at every 6.706 mm, while those of the Lothal scale are at 1.7 mm, the ratio being that 4 Lothal graduations are equal to one graduation of the Mohenjo-daro scale. The smallness of the Lothal scale-graduation indicates that it was used for finer measurements. Rao is of the opinion that the famous Indus seals were measured with the smaller graduations of the Lothal scale. This is a very plausible and satisfying explanation.

The fineness and accuracy with which the Lothal and Mohenjo-daro scales have been graduated is on par with the great care and skill with which hard stones like chert and agate have been fashioned into weights.

While comparing the theoretical and actual lengths of linear measures, it should be borne in mind that, even under modern conditions, it requires very costly machinery to draw lines to a thickness of 0.050 mm. Further, it is difficult to read, with the naked eye, graduation lines separated by a distance of less than half-a-millimetre. It is, therefore, necessary to understand that when the calculated length of say, 68 mm is equated with an actual distance of, say 67 mm, we may not be introducing a substantial error in our argument. Such equations have always to be treated as guidelines rather than strick mathematical formulations.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

We may now study how the scales, analysed above, have been used in some aspects of the Indus Civilization. Bricks offer a readily available but, very rough, starting point for the examination.

Baked as well as burnt clay bricks are known to have been in use in the Indus Civilization. The nominal sizes of the bricks found are:

(a) 225 × 115 × 57 mm (Mohenjo-daro)
(b) 250 × 125 × 60 mm (Lothal and Mohenjo-daro)
(c) 280 × 140 × 65 mm (Lothal)
(d) 300 × 150 × 75 mm (Kalibangan and Mohenjo-daro)
(e) 400 × 200 × 100 mm (Kalibangan)

It is notworthy that in all cases, the three sides of the bricks bear a ratio of 1:½:¼ which is a very practical and logical ratio. The new 'metric' bricks now being progressively used in India have nominal dimensions of 200 × 100 × 100 mm i.e. 1:½:½.

It is obvious that the longest side of the Mohenjo-daro brick, namely 225 mm, is nearly 9 × 25.6 mm, i.e. 9 times the major graduation of the Lothal scale. The longest side of the Lothal brick, namely 250 mm, is equal, within limits of error, to 150 small graduations of the Lothal scale (1.7 mm, of each) or 10 major graduations of 25.56 mm each while the longest side of the larger brick, namely 280 mm, is made by the addition of one major graduation or 15 small graduations on the Lothal scale i.e. 11 large graduations (25.56 × 11 mm).

The brick with 300 mm side is a further extension of the above principle and comes to 180 Lothal small graduations or 12 large Lothal graduations (25.56 × 12 mm). In like manner, the 400 mm brick would appear to be equal to 16 large divisions of the Lothal scale (25.56 × 16 mm).

This analysis shows that, perhaps, bricks were made in dimensions which were integral multiples of large graduations of the Lothal scale, namely 25.56 mm. the other dimensions of the bricks, being in the ratio of 1:½:¼ also fall into a rational number of Lothal graduations.

Turning to other sources of measurement the 'Great Bath' at Mohenjo-daro had average measurements of 11.89 m × 7.01 m with a depth of 2.44 m. Adjoining the 'Great Bath' were smaller rooms of 2.9 m × 1.8 m each. It is apparent that each of the smaller rooms had approximately ¼ of the average measurements of the 'Great Bath' (2.9 × 4 = 11.6 and 1.8 × 4 = 7.2). In their turn, the measurements of the smaller bathrooms are related to the bricks having 300 mm as the longest dimension. Thus, the longer side of the bathrooms is 10 times and the smaller side 6 times the longest side of the 300 mm brick. The longer side of the 'Great Bath' is equal to a length of 40 bricks and the smaller side to a length of 24 bricks, the depth being equal to the length of 8 bricks.

Rao has recorded that the average measurements of the dock at Lothal are 214 m × 36 m, the foundations being 1.78 m wide and the walls above the ground 1.04 m. These measurements are interesting, because 1.04 m is equal to 40 large graduations of Lothal scale (25.56 mm), while 1.78 m is equal to 1,000 times the small graduations of (1.7 mm) of the Lothal scale or 66 2/3 large graduations of 25.56 mm. The major dimensions of the dock are in the proportion of 6 : 1. The dimension of 36 metres is 20 times the width of the foundations, namely 1.78 m. The latter value is in turn related to the small graduation of the Lothal scale by 1,000 times.

The width of the doors in the houses at Mohenjo-daro was about 1.02 m. this is 40 times 25.56 mm, the large division of the Lothal scale or 15 times the large division of Mohenjo-daro scale, namely 67.06 mm.

There are numerous other dimensions and measurements which could be analysed. But, it is considered that the examination carried out so far is adequate for indicating that the three scales discovered in three widely separated centres of the Indus Civilization are interrelated, and can explain satisfactorily the dimensions of the bricks, the baths the dock and the like.

It may now be possible to examine the influence, if any, of the Indus length-measures on the length-measures discovered or mentioned in later literature. No specimens of scales used in later period are available but the most important source of information for the period after 1500 B.C., is again the *Arthasastra* of Kautilya.

The author has shown, in his articles (Mainkar and Raju 1964, 1965) tracing the development of length and area-measures in India, that the *angula*, which is the basic unit for length measures, mentioned in the *Arthasastra*, is 17.78 mm. This value is so nearly equal to the value of ten small graduations on the Lothal scale (1.703 × 10 mm), that they may be considered as being practically equal. If this is accepted, and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Rao (1973) agrees with it, the entire series of length-measures specified in the *Arthasastra* falls in a pattern with the Indus scales. The author has shown in his articles mentioned above, that the length-measures used in India throughout later periods were related in some manner or other, with the length-measures specified in the *Arthasastra*. It is, therefore, possible to assert that the Indus length-measures had a very profound influence on the length-measures used in India up to a few years back.

Those who are familiar with the British system of weights and measures will find it interesting that the large division of the Lothal scale, namely 25.56 mm, is almost equal to an inch (25.4mm).

Area Measures

In the progressive Indus Civilization, the use of area-measures should have been quite common. There is, however, no piece of evidence which could be connected with an area-measure. The area of the 'Great Bath' or of the dock at Lothal does not give adequate guidance about area-measures. The areas of the lands on which granaries or houses stand are also not useful guides to establishing the units of area measures.

In view of these limitations, it will not be possible to examine the units of area-measures used in the Indus Civilization and to study how they were related to the units of area-measures used in later centuries in India.

Volume-Measures

In the excavations carried out at various sites of the Indus Civilization a variety of pots made of clay, and sometimes of metal, has been discovered. As pots are usually made in such a manner that they have a definite volume, it is likely that a determination of their volume may provide a clue to the denominations of volume measures used in the Indus Civilization. No systematic determination of the volumes of pottery seems, however, to have been made. A simple, though rough, procedure for the determination of volume of pots without the use of water (which might affect the paintings and other decorations on the pots) would be as follows:

Take well-sifted fine sand. Keep it in a hopper, the feeding end of which should be about 20 cm above the mouth of the pot. Allow the sand to flow under gravity into the pot and when a heap has been formed on the mouth of the pot, stop the flow. Level the heap with a straight rod or plate so that the sand is filled upto the top of the mouth of the pot. Weigh the pot and the sand. Remove the sand and weigh the empty pot. Determine the density of sand in a suitable manner. The volume of the pot can be calculated from the weight of the sand and its density.

In the absence of any data or samples of volume-measures, experiments on the above lines may yield useful results.

Measurement Of Time

Measurement of time has played an important part in human endeavour from very ancient times. The scale which has to be covered in the table relating to time units is really vast because it has to encompass within it a unit as small as the heart beat and as large as the diameter of the universe then known. All the major activities of man are related to measures of time. This is the reason that every country had compiled its own table of time-units. These units used to be widely different from country to country, excepting in the case of natural time units such as the day, the lunar month, or the year. No information is available about the time units used in the Indus Civilization although there is sufficient evidence, on the basis of weights and measures used in that civilization, to assume that the thinkers of that civilization had evolved a time-scale to suit their requirements.

Conclusion

It has been established so far, that the weights discovered in the Indus Civilization were very accurate, had a narrow range of permissible errors and were carefully made from hard stones such as chert and agate. The denominations of the weights had decimal divisions like the metric weights of today.

It has been shown that the three broken pieces of length measures discovered in three different places in the Indus Civilization are interrelated with each other, in spite of the apparent differences noticed in them at first sight. The dimensions of bricks, Great Bath, dock, etc. can be easily related to these length-measures.

No data about area-measures, volume-measures and time measures are available at the moment.

It has been observed that the series of weights and length-measures discovered in the Indus

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Civilization had a distinct link with the weights and length-measures that were used in the civilization in India after the decay of the Indus Civilization and also had perhaps a profound influence on later Greek weights and length-measures. An analysis of the series of weights mentioned in the *Arthasastra* and the *Manusmriti*, which succeeded the Indus Civilization, after a gap of over a thousand years, showed that they could be easily related to the Indus series of weights. The length of the unit called *angula* which formed the basic unit of the series of length-measures elaborated in the *Arthasastra*, is directly traceable to the length-measures used in the Indus Civilization.

It will, therefore, be seen that the Indus metrology had considerable influence on the metrology practised in later centuries in india.

This study also leads to certain general conclusions about the organization of Indus metrology. These are summarized below:

[1] The weights of smaller denominations were made from hard stones like chert and agate in the form of well-cut and highly polished cubes or truncated spheroids. It appears that, with the limited number of cutting and grinding tools available to the people of those days, it would have been difficult to re-fashion these stone weights for fraudulent use.

[2] Besides the stone weights, clay weights of higher denominations also appear to have been in use. The main point is that even these clay weights which could have been so susceptible to manipulation for fraudulent use, have substantially uniform masses.

[3] The second striking feature of the Indus weights is that the masses of the weights have remained constant, within narrow limits of errors, over vast stretches of land and long spans of time. What is more, even their geometrical shapes and dimensions had not undergone any significant changes. And these geometrical shapes rarely gave way to fancy shapes like those of animals as in Sumerian, Assyrian and other contemporary weights.

[4] The high accuracy of the stone weights would also lead to the possibility that sensitive beam scales were available to compare the weights. The technology of manufacturing and maintaining accurate and sensitive beam scales was apparently well understood by the Indus manufacturers and authorities, because, without such beam-scales, the stone or clay weights could not have been maintained accurately within narrow limit of error. The principle of euqality of arms of the beam-scale was obviously appreciated. The discovery of the small beam-scale, very similar to a 10 gramme bullion balance of today, suggests that small quantities of precious metals and materials were weighed regularly for trade or other purposes. The discovery of gold and silver ornaments studded with precious stones lends credence to the view that the trade in ornaments was important.

[5] On the basis of this constancy of shape and error, it is possible to postulate, as a working hypothesis, that the regulation of denominations, accuracy and shape, which would be acceptable even in modern legal metrological practice, was exercised through a well organized,, direct or indirect, control over the manufacture, use and verification of weights and measures. In all probability, the control was effected through a 'Central Department of Weights and Measures' or its equivalent which was authorized to maintain the equivalent of the modern national standards of weights and measures against which the weights and measures in use were verified, directly or through lower standards.

The evidence would also suggest the logical corollary that weights in use were regularly and periodically verified for their accuracy, perhaps through a number of regional offices. This suggestion arises from the fact that it is not possible, even with today's fast communications, for a Central Weights and Measures Office to undertake the periodical verifiction of every weight and measure all over India. The work is done today through State Offices. In view of the vastness of the region, a similar arrangement might have existed in those ancient times.

The practice of verifying weights and measures after every four months described in the *Arthasastra* may be a continuation of a similar practice in the Indus Civilization.

[6] Even in the case of length-measures, there is an underlying uniformity which was established by analysing indirect data such as sizes of bricks, baths, docks and the like. The workmanship of the Mohenjo-daro scale is of a high order, emphasizing the love of the Indus people for perfection in their weights and measures. The non-availability of full specimens of length-measures impedes their proper evaluation.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

[7] The uniformity and accuracy of weights and measures, over hundreds of years, suggests a well-developed sense of responsibility on the part of the authorities concerned, namely the Government, in ensuring that the major tools of trade—weights and measures—were periodically verified, perhaps in accordance with a law. There is reason to believe that offenders were adequately punished so as to discourage the manufacture and use of false or fraudulent or non-standard weights and measures.

As adequate actual evidence is not available regarding the existence of the law or code, it is not possible to ascertain the nature of the law and the enforcement organization, but it can safely be said that whatever their form, both were superior to those described in the *Arthasastra* of Kautilya, written a thousand years later. This conclusion is reasonable because the *Arthasastra* law relating to weights and measures and the organization established under it to enforce the law uniformly had a life-span of hardly two centuries before they crumbled, as against over one millennium in the case of the Indus Civilization. It is, of course, possible that the more settled condition of life contributed towards the efficient management of weights and measures during the Indus Civilization.

[8] The tendency to postulate that other countries, like Egypt or Assyria, influenced Indus metrology may have to be given up in the light of the sophisticated organization of metrology in the Indus Civilization. The oldest weights and measures discovered in archaeological excavations anywhere in the world belonged to the Indus Civilization (Berriman 1953). On the other hand, it is probable that, with its superb organization of metrology, the Indus Civilization may have influenced Egyptian, Sumerian, Mesopotamian and Greek metrology.

Finally, it may be emphasized once again, that the system of weights and measures (which was decimal) and the organization established for its enforcement were unique features of the Indus Civilization, which could not be matched by other contemporary or even later civilizations in India or abroad.

Punch-Marked Coins And The Indus Civilization

Several of the marks found on the punch-marked coins are identical with those on the seals of Mohenjo-daro and Harappa and, therefore, appear to show a derivation from the Indus Civilization and close similarity with the Mohenjo-daro and Harappa pictographs.

Pran Nath was the first scholar to note this striking similarity between the symbols found on the Mohenjo-daro and Harappa seals and those on punch-marked coins. *(Indian Historical Quarterly,* 1931-32, Vol. VII and Vol.VIII). On similar premises, Walsh illustrated a few symbols found on the coins of the Bhir Mound hoard from Taxila with indentical symbols from the Mohenjo-daro seals and copper tablets (Memoirs of the Archaeological Survey of india, No.59, pp. 91-96). Durga Prasad illustrated at least thirty-six symbols which had a definite resemblance to the Mohenjo-daro pictographs.

The discovery by Rao Bahadur K.N. Dikshit of the conformity in shape and weight system of the punch-marked copper coins and the metal pieces recovered during the excavations at Mohenjo-daro is another important support in favour of their similarity.

Fabri's theory is more conclusive. The humped Indian bull, the elephant, the tiger and the crocodile, etc. on the punch-marked coins and the Harappan seals meant to him that not only were the objects similar, but that there were similarities in such small details that one must necessarily suppose that they were not due to mere chance. (The Punch-Marked Coins, a Survival of the Indus Civilization, *JRAS*, 1935, 308).

Allan and Kosambi did not set much store by this discovery. Allan feels that it is impossible to connect the majority of symbols with those on the seals but he admits the chance similarity of certain symbols such as the fish and the rhinoceros.

The similarity in the types represented on both—the execution of the symbols and the similarity in detail—coupled with the discovery of the relationship between the two standards of weight, would show that there might have been a phylogenetic connection between the two.

REFERENCES

Acharya, N.R. 1946 *Manusmriti.* with a commentary by Kullka. Nirnaya Sagar Press.

Berriman, A.E. 1953. *Historical Metrology.* London: J.M. Dent & Sons.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Kangle, R.P. 1963. *The Kautiliya Arthasastra.* University of Bombay.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro.* Vol.I. ch.XVII.

Mainker, V.B. and Raju, L. 1965. Development of Length and Area Measures in Western India. *Metric Measures.* 3 parts, New Delhi: Govt. of India.

Raju, L. and Mainker, V.B. 1964. Developement of Length and Area Measures in Western India. *Metric Measures;* Vol.7 New Delhi: Govt. of India.

Rao, S.R. 1973. *Lothal and the Indus Civilization.* New Delhi: Asia Publishing House.

Shamasastri, R. 1929. *Kautilya's Arthasastra.* third ed.

Standards of Weights and Measurements Act 1956. New Delhi.

Vats, M.S. 1953. *Excavations at Harappa.* Annals of the Bhandarkar Research Inst.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

16

Brij Bhusan Vij

Linear Standard in the Indus Civilization

The study of metric technology is considered a recent thought (Vij 1973). The bold step to introduce this technology, in the recent past, was taken by Simon Stevin, a British engineer (A.D. 1548-1620) and Jean Picard, a French astronomer (A.D. 1620-1682). They won over Talleyrand to their view and he persuaded the French Constituent Assembly to entrust, to the French Academy of Sciences (8 May, 1790), 'the task of establishing a measuring system which could be acceptable to the whole world'. Accordingly, the original prototypes for the 'metre' and 'kilogram' were prepared and deposited in the Archives of the French Republic on 10 December 1799 and also its use was made obligatory by the Law of 4 July 1837.

The author's concern in the study of material evidence of ancient excavations primarily was to investigate whether Time, Angle and Calendar can be brought, into the so far unsuccessful attempts, under the metric fold. It need not be over-emphasized that a great deal of perfection was achieved by the Indus Valley people in their standardized (ISO Sov. 1964) practices and technological progress. It is evidenced from two specific linear examples (Wheeler 1966):

(a) The 'Great-Bath' at Mohenjo-daro; and
(b) The broken 'shell' from Mohenjo-daro considered a part of the complete linear measure of Indus civilization. **(fig. 16.1).**

The Value 'Pi or π'

The Indus Civilization achieved perfection in its 'measuring technology' and high standardization in 'preservation techniques'. The material evidence also suggests that the ideas of the circle and angle, and also the 'ratio between the circumference to the diameter of the circle' was known to this culture. The dimensions to which the 'great-bath'—discussed later—had been constructed, leave no doubt in the mind of the author that the idea of angles and their trigonometric functions were within their speculative imagination. It would also follow that knowledge of the value of Pi or π to the culture of the Indus Valley cannot be discarded. If this be so, what was the ratio between the circumference to the diameter of the circle? Did the ancient culture rationalize the angle 'radian' and assign it any specific value? Perhaps yes.

Numerous series have been developed by eminent scholars to express Pi around the announced results, which are not free from 'truncation and rounding off' errors. The most recent approach being the development of $\tan^{-1} x$ or arc tan x series due to Leibniz. The data processed by an IBM 7090 computer claiming Pi to have been calculated up to 100,000 decimals (Wrench and Shank 1962) need investigation of the property whether the series has a *non-ending, non-repeating character.* The various values of Pi used during differing periods, in the recorded history, are processed and tabulated in Appendix A.

The Indus Unit

The linear unit for measurement of length—metre—was intended to have a physical relation to the earth. Accordingly, the metre was defined

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

(Mainkar and Raju 1964) as the 'one-ten millionth part of the quadrant of the meridian of the earth passing through Dunkirk and Barcelona' by the first Conference Generale des Poids at Mesures (CGPM) at Paris in A.D. 1889. This length has now been standardized and redefined at the 11th conference Generale des Poids et Mesures in 1960, which reads as:

Metre is the length equal to 1 650 763.73 wave-lengths in vacuum of the radiation corresponding to the transition between the energy level $^2p_{10}$ and $^5d_5$ of the krypton-86 atom, the atom being at rest with respect to the observer. Effort is also underway to modify the definition of the *metre* during A.D. 1981 by CCDM at the proceedings of Conference Generale des Poids et Mesures (CGPM).

The broken piece of linear measure or 'shell' excavated at Mohenjo-daro by itself speaks of the high standards in preservation technology. The well finished piece is not liable to warp, crack or get affected by temperature changes and measures 1.57 cm in width, 5.29 cm in length and 0.67 cm in thickness. The dividing lines are cut with a fine tool into subgroups of 5 divisions marked with a dot and circle, also suggesting the use of the decimal scale between any *two* dots or circles. It will be interesting to observe that the 'uniform thickness' of this shell had been standardized to 1/10 of the distance between the two dots or circles. The estimated distance between the dot and the circle is believed to be 33.53 mm. This distance was termed 'The Indus Inch' (Berriman: 1953) when the British ruled India and inch was 1/36 th part of the legal linear unit of length—yard. The Indus Inch was designated to represent the distance fourth-root of 3 or 1.316 074 British inches (3.342 827 96 cm).

The term 'Indus Unit' is henceforth used, in this work, referring to the excavated 'shell' during 1921-22 at Mohenjo-daro and kept in the National Museum, New Delhi.

The distance between the dot and circle on the excavated 'shell' can now be worked out, based on two scientific assumptions (Vij 1982), of course:

(a) 1 British Yard = 0.914 4 Metre (exactly)

(b) Pi or π = $\frac{100\,000}{31831}$ (exactly)

The distance metre (new) works to 39.379 039 698 6 British inches or 29.993 173 303 9 Indus units (say 30 I.U.) each such unit being equal to 3.334 092 027 25 cm (new). The suggested linear measure, metre (new) on modification of the existing metre be defined as:

Metre (new) is the length equal to 1 651 139.198 in vacuum of the radiation corresponding to the transition between the energy levels $^2p_{10}$ and $^5d_5$ of the krypton-86 atom, the atom being at rest with respect to the observer.

Choosing the standard hyperfine frequency of Hydrogen as 1 420 405 751.770 Hz + 0.003 Hz, the linear measure metre(new) works to 4.739 041 287 25 cycles. This distance will be covered in $0.771\,802\,603\,28 \times 10^{-8}$ metric second; at the velocity of light *i.e.*, $1.295\,668\,083\,71 \times 10^8$ metre (new) per metric second.

The evidence revealed at the places of excavation leaves no doubt that the Indus Civilization was well advanced in all sciences and their technological capabilities had a very high rating of standardization in actual practice. The Indus Civilization certainly knew the realistically 'exact' value for the ratio Pi and hence the measured dimension of the circumference of the earth was within their technological capability. This is obvious from the following facts :

(a) The existence of a few objects believed to be instruments used to determine the position of the star; also the prediction of astronomical phenomenon. Such instruments were a positive contribution for the measurement of angles. (Rao 1973: pl.XXX B).

(b) The existence of the linear measure—Indus Unit—whose 30 units closely conform to the present linear scale—metre. A distance of 10 such metres work to 32.816 British feet, which agree with the actual measurement of the road width of 33 feet (Mohenjo-daro and Lothal scales).

(c) The construction and geometric plan of the 'Great-Bath' had its measured dimensions: 46 feet as its base diagonal, 23 feet broad and 8 feet deep, with the plan area of 100 sq. yds. (all dimensions in British measures). The plan area works to about 85 square metres (new).

The 'bath' can be interpreted to have been specifically constructed for use as a 'possible observatory' rather than a mere 'community swimming or bathing pool'. If the intended dimensions are proccessed in relation to the application of trigonometric function of angles astonishing facts come to light.

ANGLE
FUNCTION

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

SINE
COSINE
TANGENT

ABCD represent the base plan of the 'great-bath' with its broader side BC — 23 feet or 7.01 metre; and the diagonal AC — 46 feet or 14.02 metre. If the standard dimensions of the bricks used during that age is accepted as 300 mm × 150 mm × 75 mm, it will be seen that the length, breadth and depth needed about 40, 24 and 8 'brick-lengths' respectively. A total of 61 444 such standard bricks would be needed to fill the volume of the 'great-bath'. This suggests that the idea of a right-angled triangle, i.e. the Pythagorus theorem, and hence $\pi/2$ goes back to antiquity; at least to the Indus Valley Civilization. The historical facts also confirm this aspect as evidenced from the statements in the *Apasthamba, Baudhayana* and *Katyayana Sulbas.* Baudhayana mentions: 'the diagonal of a rectangle produces both (areas) which its length and breadth produce separately'. The intention to keep the base diagonal to be twice the broader side also suggests the effort made towards physical evaluation of the value $\sqrt{3}$; since AB = $\sqrt{3}$ × BC. It is possible that they also knew the significance of the equation for the circle $a^2 + b^2 = c^2$. The base plan was, thus, made to specific fixed angles :$\pi/22$, $\pi/23$, and $\pi/26$ representing their trigonometric functions as:

The longer side, AB, thus worked to the measured dimension of 39.78 feet or 12.124 metres (i.e. 3 × 7.01 metre). Not only this, the depth of the 'great-bath' was very carefully chosen to represent an angle $\pi/18$ between the base diagonal and the 'skew diagonal', i.e. the angle CAE in the figure. The measured height (from base upward) represents the linear distance 8 feet or 2.44 metre, which make Sine CAE – Sine $\pi/18$ = 2.44/14.02 = 0.174 037 conforming the statement that Sine CAE = Sine 10° = 0.173 6 (from common log. tables). Hence, the idea of angles and their application was definitely known in the antiquity of past India. The author, therefore, concludes:

> The Great-Bath at Mohenjo-daro was constructed to meet specific intention/requirement, possibly to make an astronomical observatory; and that it was not just a 'community swimming pool'.

METRE (LONG)

The present linear measure, the metre, has 100 graduations, each graduation representing a centimetre. It is unfortunate that the excavated 'shell' of Mohenjo-daro is only a fragment of the full scale. The rod-like bronze scale found at Harappa (Wheeler 1966) has 4 marks at an average distance of 0.934 centimetre, which also is not complete. The 'ivory scale' discovered at Lothal (approximately 13 cm × 0.6 cm) is not accurately marked (Rao 1973: pl. XXXII). It can be known that 20 divisions, each of average 1.7 mm, conform to the measured results of the Mohenjo-daro 'shell-scale'. Archaeologists have been trying to estimate the basic and rational measure of length used by the Indus Civilization. It is interesting to observe that the 'ancients' used the *hasta* hand (24 *angula* or finger width) for administrative and commercial use; each *angula* being 25/12 centimetres (new). The *hasta*, thus, was 50 cm(new) or 19.685 British inches.

The dimensions of the Mohenjo-daro bath in various multiples of the Indus Unit are presented for examination in appendix B. A close observation of columns 3 and 4 strongly suggest that the 'probable' basic unit, larger than the Indus Unit, was closely linked with *twice the length of the metre(new).* This larger unit — called Metre (Long) — possibly had a total of 60 graduations, each being equal to the distance represented by the Indus Unit = 3.334 092 027 75 centimetres(new) between the circle and the dot. Two groups of 5 smaller divisions met the need to have a smaller, decimally-divided scale. The difference of opinion among scholars about the origin (Mainkar and Raju 1964) of the *'hasta'* could be based on various historical interpretations. However, it is worthwhile to compare Gudea's rule (in 2175 B.C.); being divided in 30 parts of 50.29 cm (19.8 British inches), establishing a physical relation with the 'Great-Bath' of Mohenjo-daro. Did the Indus Civilization develop their sciences of mathematics and astronomy to the extent of conceiving that space (distance), time and angle were correlated? The following consideration strongly points to this probability.

The circle of solid sphere could have Pi or π = 100 angular units, each such unit being equal to 2 degrees metric or 1.8°. Working on this line, one can establish the conclusion that 1/100 of this angular unit resulted in *one Indus kilometre:*

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

a distance represented by one kilometre (Long) = 2 kilometres (new). This was the distance *'goruta'* as described in Kautilya's *Arthasastra* (fourth century B.C.) and also *'krosa'* referred to in the *Lalitavistara*, Chapter 12, written in the first century A.D. An equivalent to this distance is still known among the Indian villagers, called *Kos*, which is equal to the British 1¼ mile. Also, 1 angular unit in space will work to 200 kilometre (new) or 25 *Yojanas*. The hour angle, in time, for use by the astronomical/astrological communities thus used 10 angular Unit = 250 Yojanas = 2,000 kilometres (new), in distance. It is also surprising to note that the ancient culture indicates the use of both 'decimal scales'; i.e. the sexagesimal notation of numeration (in groups of 6's) and the present decimal notation of numeration (in groups of 10's). It can, therefore, be presumed that *this was the time when* the present decimal system was being absorbed into the Indus technology, presenting new dimensions in creative thinking.

CONCLUSIONS

The author draws the following conclusions:

[a] The Indus Valley Civilization had an extremely high rating of standardized practices followed in construction and preservation technology.

[b] The origin of the 'metric system' can be traced, as evidenced from the dimensions of the Mohenjo-daro 'Great-Bath', back to the Harappa Culture which had developed the metric-based measurement technology. Evidences also indicate the use of decimal science based on the 'sexagesimal numeration'.

[c] An equivalent unit of linear dimension — Metre (Long) — was known in the antiquity of the Harappa culture some 2,500 metric years ago. This unit was realistically the same as twice the linear distance of the metre(new).

[d] The significance of inter-linking *time, angles and hence calendar* in the technology of the Indus Civilization becomes obvious.

[e] The present linear unit, the metric, needs to be corrected as 1.000 227 451 22 times the present metre distance. The Metre (New) will correspond to 1 651 139.198 wave-lengths of krypton-86 atom or to the distance covered by electromagnetic waves, in vacuum, during 0.771 802 603 28 $\times 10^{-8}$ metric second at the velocity of light. which is: 1.295 668 083 71 $\times 10^{8}$ metre (new) per metric second (or 299.792 456 2 $\times 10^{8}$ metres/second). Accordingly, the distance between the 'dot and circle' on the excavated linear-shell of Mohenjo-daro is 33.340 920 277 5 millimetre (new).

[f] The 'great-bath' of Mohenjo-daro was scientifically constructed to calculated dimensions, indicating the keen sense of mathematics and astronomy. This was therefore an important observatory, apart from being a 'community bathing/swimming pool'.

REFERENCES

Berriman, A.E. 1953. *Historical Metrology*. JM Dent & Sons, London.

Chatterjee, Bina. 1974. *History of Indian Mathematics* (Ancient and Medieval periods). *INSA*. Cyclostyled. New Delhi.

Guy, Knoche. Specialized forms of Measures in Metric System. Extract with ISI library Box 389. 151; published in *French Economic & Tech.Bull.* Paris.

ISO Recommendation. 1965. R-31 Part I; 2nd Edition; December.

Mainkar, V.B. 1964. Standardization in Pre-historic India. 6th General Assembly, Indian Standard Institute; New Delhi. Nov. 1964. ISO *Souvenir - 1964*.

Mainkar, V.B. and Raju, L. 1964. A Development of Length & Area Measures in South India - Part I. *Metric Measures*. Vol. 7; 7.

———. 1964 B. Development of Length and Area Measures in South India Part I. *Metric Measures*. Vol. 7; 5.

Metrologia. 1974. Vol. 10 2; 61-67. Resolution No. 6. 11th Conference Generale des Poids at Mesures. 1960.

Richmond, B. Chronology of Time Measurement. *Time Measurement & Calendar Construction*. 174-185.

Shamasastry, R. 1967. *Kautilya's Arthasastra*. 8th edition. 121.

Vij, B.B. 1973. System Internationale d'Unites - REDEFINED. Doc. S-6/8. 15th Indian Standards Convention. Coimbatore; December 15-22; 2.

———. 1974. The Absolute Pi or π. Paper submitted to INSA, New Delhi. Also, *Metric Philosophy*. (unpublished).

———. 1982. *Towards a Unified Technology*, Soni Book Agency, Jail Roada, New Delhi. 185-211.

Wrench and Shank. 1962. Calculation of π to 100 000 decimals. *Mathematics of Composition*. Vol. 16, 77; 76-99.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

17

R.C. Agrawala

Aravalli, the Major Source of Copper for the Indus and Indus-related Cultures

The explorations and excavations conducted by us during 1977-1981 in northern Rajasthan, particularly in the copper belt area of Khetri, have added an entirely new dimension to our understanding of the copper metallurgy in the Harappan and related contexts. We have now definite evidence of large-scale copper-working in and around Ganeshwar, a newly discovered site in the District of Sikar. The culture associated with this site may easily go back to 3000 B.C. We suspect that the Harappans and pre-Harappans in north-western Rajasthan and Haryana received their much needed copper ingots and copper objects from this very region, perhaps through intermediaries. We, however, also suspect that the copper used in the context of the late contemporary peripheral cultures, such as the Ahar or the Banas Culture and the Ochre Coloured Pottery Culture (OCP), came from the local sources of the sites and not from Ganeshwar, though these sources were also located within the Aravalli hills. Here we present the relevant data on copper tools and the sources for their metal in the context of all three above mentioned cultures of the third and second millennia B.C. We shall begin with the Indus-related Ahar Culture sites and then pass on to the Indus sites since while, as said earlier, the former group of sites exploited the local copper-bearing localities, the latter group of sites looked towards distant sources in the Khetri region where the important site of Ganeshwar **(fig. 17.1)** has recently been excavated with epoch-making discoveries.

Ahar Culture Sites

Archaeological excavations and explorations, in different parts of Rajasthan, during the past thirty years, have brought to light vestiges of several protohistoric cultures datable between 3000 and 1000 B.C.; one of which is the Ahar culture, using copper objects. The copper objects from the excavations at Ahar near the town of Udaipur, it is significant to note, were prepared from the copper ores available near Ahar, the type site of Ahar culture, datable to 2200-1000 B.C. bracket., We have been able to locate old copper workings at Matoon and Umra, at a distance of about 12 km from this site. The extraction of copper is very well attested to by the heaps of copperslag lying scattered within a radius of 100 to 150 m between the Matoon and Umra mines. The discovery of a copper furnace at Ahar is, therefore, not surprising. The copper objects include bangles, rings, celts, etc. (Sankalia 1969: 199-203). The copper celts from Ahar are, however, comparatively thin and small in size; the maximum length is 13 cm, the width of the butt-end is 8.3 cm and the maximum thicknes is 0.5 cm. This may have been due to the meagre quantity of copper available in the local ores. On the other hand, we were able to procure in 1977, from Padaliya—in the vicinity of the Ahar culture site of Pind, near Bari Sadali, in Chittor district—six copper celts (Agrawal 1979: 91-93) which measure between 20 and 25 cm in length and which weigh about one kg each as compared to about 240 gm of weight of the Ahar celts. This proves beyond doubt that different varieties of copper celts were prepared at different centres of the Ahar culture and the determining factor was, to a great extent, the quantity and quality of copper ore available locally. The copper mines of Bhinder and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

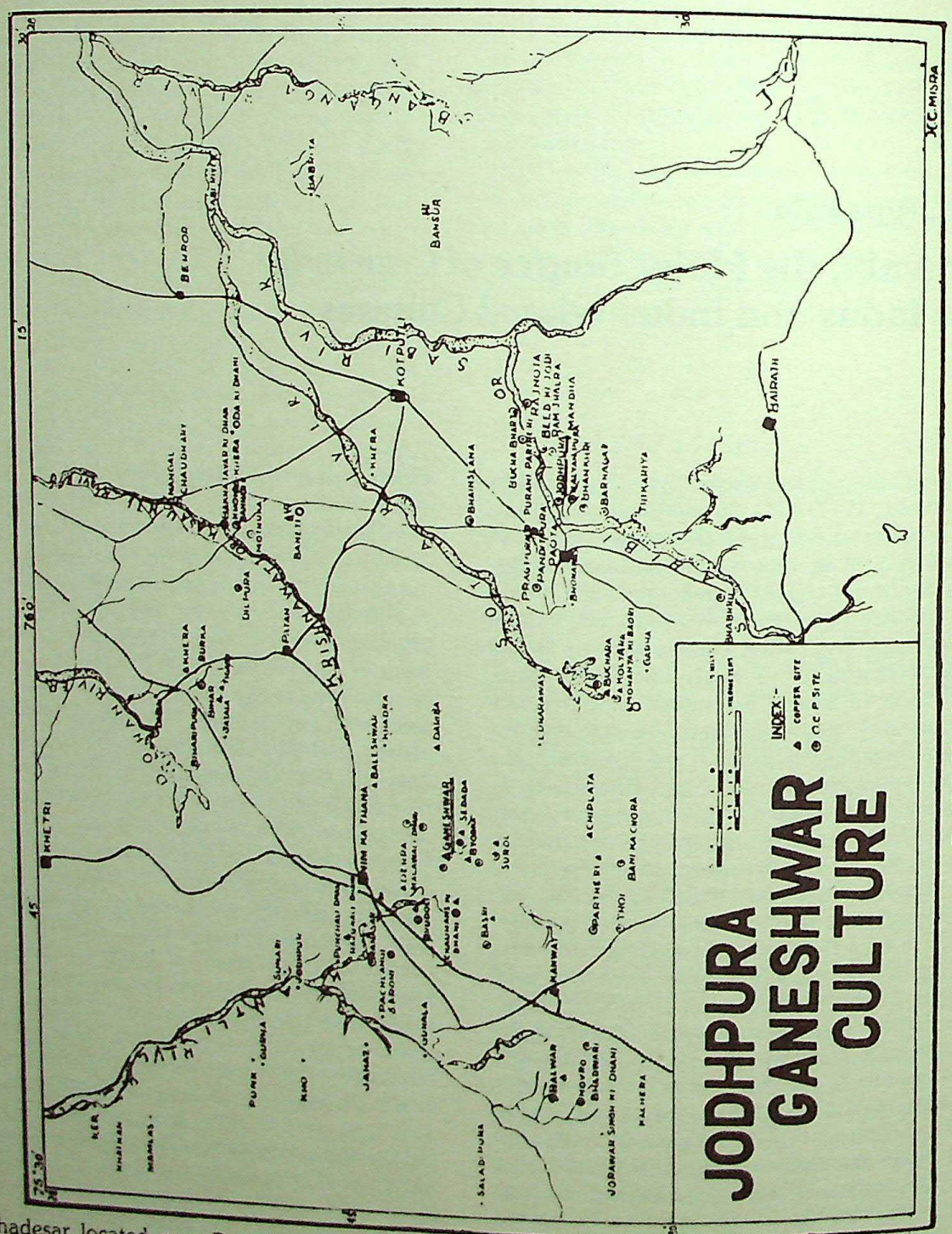


Fig.17.1. Map showing Ganeshwar and other sites

Bhadesar located near Bari Sadali are not far from Padaliya. Significantly, these mines are richer than the Matoon–Umra mines.

Our earlier work at Ahar in 1955-56, yielded 69 copper objects in the form of a thin knife blade from the lowest levels and two thin chopper blade pieces from levels datable to 1500 B.C., or a little earlier. Significantly, they bear resemblance to several specimens from Khurdi or Kurada, and Mitathal in Rajasthan and Haryana respectively (Agrawal 1980: 89-91).

The Ahar choppers also bear resemblance to a curved blade from the pre-Harappan levels at Kalibangan. In fact, this was an object of great

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

utility and bears resemblance with the modern *gandasa* of frequent use in the Punjab, Haryana, U.P. etc., for cutting stalks of wheat, barley and rice plants as well as long thick grass for animal fodder. This Kurada Hoard, from a site called Kurada, in the district of Nagaur of Rajasthan,
70 contained at one time, twenty-one such copper blades whereas now only four are known, and are preserved in the Government Museum at Jodhpur.

The thin blade of the copper knife from the lowest levels at Ahar, also recalls similar specimens from Harappa, and other Harappan sites. Thus, the copper tools from Ahar had both, the Harappan and the non-Harappan chalcolithic traditions which is quite understandable because Ahar was a late contemporary to the Indus Civilization.

Till recently, it was believed that the Ahar culture had its spread along the Berach-Banas group of rivers and their tributaries alone. But our recent work in the Udaipur and Dungarpur districts, have shown us that it had spread outside the Banas zone as well. The extensive site of Depura, on the left bank of the river Som, Aspura and Karelia, on the right bank of Som in Dungarpur district, Jhadol-Bespara-Utpuria on the Tidi-Gomati rivulets, etc., are some noteworthy Ahar sites in this direction. They are located in the copper zone of Mewar and, therefore, the copper objects in them are likely to have used the local ores, the ususual Aharian pattern.

Mention may also be made of our recent discovery of an interesting Ahar site at Ojyana, in the Asind Tehsil of Bhilwara district. The site is located just at the foot of the local hills amidst the Aravallis. We were greatly surprised to find, at this site, several specimens of the Indus type dish-on-stand in black-and-red Ahar ware along with dozens of Kayatha type of stylized terracotta bulls. It appears that Indus traits had penetrated into Mewar along the river Luni which flows across the Aravallis here. On the other hand, the Kayatha type of terracotta bull figurines probably originated somewhere near Ojyana in Mewar, wherefrom they were carried by the Ahar people moving towards Kayatha through the rivers Chambal and Kshipra on the borders of Rajasthan. At the same time, we must also take note of the total absence of Ahar type of copper objects at Kayatha or Dangawada in Madhya Pradesh, where the inspiration for copper technology seems to have come from some source other than Ahar. Our presumption is based on the fact that the copper celts from Kayatha and Navdatoli in Madhya Pradesh, as well as from Kurada (Agrawal 1979) and Ganeshwar (Agarwal 1978: 123-124) in Rajasthan, have round indentation marks whereas such marks are conspicuous by their absence on the celts both from Ahar and Padaliya. The recent discovery of a protohistoric terracotta celt-mould at Dangawada (Malwa), does suggest local metal-casting from the ores procured from the copper mines of Tam Khan, etc., in Dewas district (M.P.) nearby. This was the Aharian method, as noted earlier.

Mention may also be made of three copper arrow-heads, with two holes each, from 2800-2000 B.C. levels at Bagor in the Bhilwara district of Rajasthan. A similar type of arrow-head has been excavated at Indore, on the outskirts of the town of the same name in Madhya Pradesh. Such arrow-heads are conspicuous by their absence in Ahar sites. The excavator of Bagor, V.N. Misra, has of course, suggested Western impact on these arrow-heads, which, to our mind, is doubtful in view of the similar finds, though without holes, at Ganeshwar. However, we have yet 76
to establish whether the Bagor arrow-heads were prepared from the local ores available at Pura Dariba, located only about 10-15 km from the village Bagor, or whether they came from some contemporary Harappan site in northern Rajasthan. In fact, the mines all along the rivers Kothari and Banas in the district of Bhilwara still preserve great reserves of copper deposits but we do not know if these were used by the Bagorians.

HARAPPAN SITES

The copper objects recovered from the excavations at Kalibangan, in the district of Ganganagar in Rajasthan, have an important bearing on ancient Indian copper technology. B.B. Lal (1979:70) and B.K. Thapar (1975:22), the excavators, have published three copper objects from pre-Harappan levels, viz. a curved blade (chopper), a celt and a bangle. On this basis, most scholars suggest that copper was scarcely made use of during the pre-Harappan period at Kalibangan. But this is far from true. The excavators have, in personal communication, told us that the pre-Harappan levels of Kalibangan have yielded a rich variety of 56 cop-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

per objects which included antimony-rods, rings, wire pieces, lumps, bangles, pins, arrow-heads, beads, rods, celts, etc. Such a rich quantity and variety of copper objects has not been reported from any of the contemporary sites, including Sarai Khola, Kot Diji and Mundigak. But how this was possible at Kalibangan at such an early stage (2700-2500 B.C., MASCA corrected dates), needs closer investigation.

The richness of copper artefacts at Kalibangan is all the more evident in the form of about 1200 copper objects from the Harappan levels. They include antimony rods, pins, bangles, beads, arrow-heads, hooks, rings, chisels, spear-heads, celts, knives, awls, fish-hooks, spouts, mirrors, axes, nails, blades, earrings, drills, daggers, needles, razors, figures of bulls, etc. The site of Tarkhanwala Dera, on the Pakistan border, has also yielded two copper spear-heads of the Harappan kind. From where were the copper ore and copper objects acquired?

A Newly Discovered Culture

About 200 km south of Kalibangan are located the well-known copper deposits of Khetri. One of its various ranges runs also in the adjoining Sikar district of Rajasthan. A number of archaeologists, including Sir Mortimer Wheeler (1968) and M.S. Vats (1940: 379) had suggested that the copper supply to the Harappans possibly came from Khetri. The trace impurity patterns of Khetri ores bore resemblance to the analytical composition of copper objects from Harappa. But what was the route which enabled the transportation of raw material to the Harappan sites? Were there any contemporary sites on the copper mines nearby? There was no answer to these questions till recently. It was on 30 November 1977 that we located a Copper Age site at Ganeshwar (Agrawal 1978), about 15 km south-west of Nim-Ka-Thana, a Tehsil headquarters in the district of Sikar and only 75 km from the actual Khetri copper mines **(fig. 17.1)**. However, the copper deposits of Ahirwala—Chiplata, Baleshwar and Dariba—are within 10 to 15 km from Ganeshwar where in November 1977 and December 1978, we discovered some copper arrow-heads (without any holes) and a spear-head along with the so-called O.C.P., i.e. red-slipped ware with pro-
75 fuse incisions in the form of parallel lines, straight
71 and wavy, arranged in bands.

The pottery of Ganeshwar bore resemblance to that from Jodhpura in the district of Jaipur, about 40 km, as the crow flies, from Ganeshwar. The ^{14}C dates of Jodhpura O.C.P. suggested the 2500-2200 B.C. bracket for its later phase—indicating, thereby, that the beginning of this ware may be pushed back to 3000-2800 B.C. Jodhpura, it may be mentioned, is situated on the right bank of river Sabi which once flowed into the Yamuna, somewhere near the Wazirpur bridge in the northern part of Delhi. It was through this river that the so-called O.C.P. people, are likely to have moved to the Yamuna basin and also into western U.P. Besides the Sabi, the river Kasaunti, originating from the Dariba copper hills (of Ganeshwar region), flowing near Mothooka copper mines and the town of Narnaul, joined the river Sabi in Haryana. A number of Jodhpura-Ganeshwar pottery sites have been discovered by us all along the rivers Sabi and Kasaunti. From the north-west of the Ganeshwar-Baleshwar hills, originates the river Dohan, which passes near the Bihar copper deposits. Here, too, we have discovered copper objects and the Ganeshwar type of pottery. The Dohan River, flowing to the west of Narnaul once reached Charkhi-Dadri and the Mitathal region where Suraj Bhan has already discovered a copper celt, a chisel, a ring and a copper harpoon. In fact, the supply of copper to the site of Mitathal seems to have been from the Ganeshwar-Narnaul region. A number of copper deposits are still available all along the Dohan river as well.

Ganeshwar, as a site, is ideally situated on the source of one of the streams of the river Kantli which is further fed by other streams from Kanwat-Thei-Khandela, all located in the copper zone of the Shekhawati region. We also discovered dozens of O.C.P. sites along various *nullah* and streamlets of the Kanwat and the Khandela, originating from Ganeshwar and discharging into the main Kantli. The pottery from this zone has been called Ganeshwar pottery and is freely available in the Sikar District of Rajasthan. The Dariba copper mines have also yielded Ganeshwar pottery **(fig. 17.1)**.

The river Kantli seems to have been a major river during the pre-Harappan period. Flowing east of Jhunjhunu town, it now dries up near Rajgarh in the Churu District; whereas, in the past, it joined the Drishadvati river somewhere between Nohar and Bhadra in the north, from where there was no difficulty in moving towards Kalibangan

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

which is hardly 50 km. The total distance from Ganeshwar to Kalibangan is just 250 km.

The Kantli river is, at some places, 2 to 3 km in width and it must have made possible, movement from Ganeshwar to Kalibangan and other Indus centres of the west. A number of Kalibangan sites along the Drishadvati river, such as Siswal, Sherpura and Sothi are well known. There is also the possibility of a stream of the Kantli flowing towards Hissar, on the river Drishadvati, where Painted Grey Ware (P.G.W.) sites have also been reported. It was possibly through this branch that the P.G.W. people penetrated as far south as Sunari, on the right bank of Kantli, and about 15 km from Nim-ka-Thana. The entire problem needs further probing though there is no possibility of the P.G.W. people penetrating Sunari either from Bhiwani-Mitathal or via Jodhpura-Ganeshwar.

Interpretation of landsat imagery seems to suggest two streams of the river Kantli from Rajgarh, one flowing towards Nohar-Bhadra and the other towards Hissar. Both these routes are now marked by railway tracks.

Our explorations and excavations at Ganeshwar and its vicinity in 1979 yielded a rich collection of copper objects, about a thousand in
74 number. These include 60 flat celts, more than
76 400 arrow-heads, 50 fish-hooks, dozens of blades, spear-heads, rods, nails, bangles, chisels, etc., all of which belong to the Indus context; and not a single specimen is of the Copper Hoard type of the Ganga-Yamuna Doab. The use of fish-hooks and arrow-heads suggests that the economy of the Ganeshwar people was still largely dependent on fishing and hunting. The beginning of Ganeshwar culture, on the basis of pottery analysis, may well be pushed back to 3000-2800 B.C. Later on, when a considerable demand for copper from the Indus sites arose the Shekhawati region of Rajasthan may have supplied the copper ore as well as the copper objects, both to the pre-Harappans and the Harappans, such as to those in Kalibangan. In the context of the Ganeshwar-Kalibangan interaction, the discovery of a round terracotta cake at Ganeshwar is very important. So also are the few Ganeshwar
71 shards with deep zig-zag incised lines in the interior portion, since they recall a similar tradition present in pre-Harappan pottery of Kalibangan
72 and Kot Diji. A few specimens of Reserved Slip Ware, including a bowl-on- stand, from Ganeshwar, also deserve special mention. The wavy black lines on the red surface are quite charming and significant too from the point of view of cultural interaction.

The copper celts from Ganeshwar measure 20 to 25 cm in length and weigh between 1 and 1.5 kg. Most of them have round indentation marks 73
on the one side of the top, such numbers vary 74
from 2 to 16 which have got an important bearing on the contemporary system of simple arithmetic. It is perhaps significant to note that the indentation marks on the Ganeshwar celts are near the butt end whereas those on the chalcolithic celts from Kayatha and Navdatoli in Madhya Pradesh are on the body of the celt, much below the butt end. This may suggest an earlier date for the Ganeshwar celts. Equally significant is the fact that the copper celts from Ganeshwar do not show any alloying with tin; tin was not available in the locality. The Geological Survey of India laboratory at Jaipur has given the following analysis of a typical copper celt:

Copper	97%
Silver	0.2%
Lead	1%
Arsenic	0.3%
Tin	0.01%
Nickel	0.6%

It is likely that the Kurada celts with four marks were prepared in the Ganeshwar region, along with copper bowls, five with channel-spouts. The 77
bowls are also important since it was the trade with West Asia which might have induced the Ganeshwar people to prepare copper bowls in imitation of the channel spouted bowls from Iran, as Sankalia had earlier suggested. It is to be noted that Kurada was situated on a trade route which runs west via Ganeshwar, Kurada-Pokaran-Phalodi-Jaisalmer-Kot Diji, etc.

The shape of some of the copper arrow-heads from Ganeshwar, knows no parallel in protohistoric India, not even outside her boundaries. Cut out of thin sheets, perhaps with a scissor-like instrument, the arrow-heads are quite thin. They were mounted on wooden sticks or reed shafts with a vertical slit at one end, and fastened with the help of a white glue which is still to be seen on most of them. At some places, the marks of decayed wood are seen quite clearly. The copper percentage in the Ganeshwar arrow-heads is 96.5; arsenic being 1 per cent and tin only .2 per

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

cent. Arsenic alloying was present in the Copper Hoards. In this context, it may also be mentioned that there are no holes on the Ganeshwar arrow-heads; though arrow-heads from Bagor, mentioned earlier, have two holes. Viewed in this light too, the Ganeshwar arrow-heads may be assigned an earlier date, the date of the Harappan or pre-Harappan culture in the 3000-2500 B.C. bracket. The copper fish-hooks from Ganeshwar do not have any barb, suggesting perhaps, the absence of big fish in the river Kantli on which the site is located. Perhaps the modern *minas* (a tribe) of this region had some links with the Ganeshwar people; *minas* in Sanskrit means fish and may well be associated with Matsya Desha bordering Ganeshwar. *Mina* and *Matsya* are synonyms. The discovery of a copper fish-hook at Budha Pushkar — the source of the Luni River—is also significant in this respect.

The Ganeshwar people seem to have been the original inhabitants of the Khetri copper-belt region and, therefore, the copper artifacts were not products of itinerant coppersmiths, as one may suppose. The entire area is rich in copper ore and people must have tapped the local sources, to begin with, for their own daily use. Fishing and hunting were their main occupations though they resorted to limited agriculture and made use of wheel-made pottery. It was their surplus wealth, in the form of copper ore and copper objects, which subsequently reached the Indus sites, perhaps through intermediaries. Our explorations of the region around Ganeshwar-Kanwat-Khandela-Chiplata-Ahirwala-Buchehra also show us that the Ganeshwar people probably did not move substantially along the Kantli river since north of Jodhpur, 30 km from Ganeshwar, Ganeshwar culture sites are rare. The picture will be clear only after the entire dried-up bed of the Kantli has been thoroughly investigated, from Ganeshwar till the point it joined the Drishadvati in Ganganagar District.

Copper celts and inverted 'V' shaped arrow-heads occur in the pre-Harappan levels at Kalibangan as well, a fact which suggests their supply from the Ganeshwar-Khetri region. The Ganeshwar type of arrow-heads are available from the Harappan levels at Banawali, in Haryana, as well.

The recent discovery of a pre-Harappan Copper Age culture in the region around Ganeshwar (Sikar district) is decidedly a landmark in the protohistoric archaeology of India. The data at our disposal are, however, still meagre but this alone proves, beyond doubt, the existence of an independent complex which may well be termed the 'Ganeshwar-Jodhpura Culture'. This complex spreads towards the Harappan sites in north-western Rajasthan through the Kantli River. This data also suggest that the Kasaunti-Dohan-Sabi and Sota rivers helped these people in their movement towards Haryana, and subsequently to western Uttar Pradesh. It is very likely that the copper mines arround Khetri-Narnaul-Toshan had supplied copper to the Copper Hoard people in the Ganga-Yamuna Doab who had specialized in the manufacture of heavy tools, including anthropomorphic figures and harpoons.

The journey from Ahar to Kalibangan, through Ganeshwar, is thus amply rewarding in under standing the Copper Age personality of the country; after all, Ganeshwar is hardly 200 km from New Delhi, 150 km from Jaipur and 250 km from Kalibangan.

REFERENCES

Agrawal, R.C. 1978. Copper Celts and an Indus Arrowhead from Kulhade-ka-Johad, Distt. Sikar, Rajasthan. *Man and Environment.* Vol. 2; 123-24; figure on p. 123.

———. 1979. More copper cells from Rajasthan. *Man and Environment.* Vol. 6; 91-92; plate I.

———. 1980. Khurdi (?) Copper Hoard from Rajasthan. *Man and Environment.* Vol. 4; 89-91; plate II on page 90. This copper hoard originally contained 7 celts, 11 chisels, 4 ordinary bowls, 5 channel spouted bowls, 21 choppers and 55 rings, i.e. 103 objects, all of copper.

Lal, B.B. 1979. Kalibangan and the Indus Civilization. In *Eassays in Indian Protohistory,* D.P. Agrawal and Dilip K. Chakrabarty. Plate V on p. 70.

Misra, V.N. 1970. Bagor: cultural significance of Three Copper Arrow-heads from Rajasthan, India. *Journal of Near Eastern Studies.* Vol. 29(4); 221-32.

Sankalia H.D. *et al.* 1969. *Excavations at Ahar.* Poona; 199-203; plates XXI-XXIII.

Thapar, B.K. 1975. Kalibangan: a Harappan Metropolis beyond the Indus Valley. *Expedition.* 17(2); Winter 1975; plate 2 on p. 22.

Vats, M.S. 1940. *Excavations at Harappa.* Vol.I Delhi.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

18

D.P. Agrawal

Metal Technology of the Harappans

A large number of metals were employed by the Harappans for a variety of uses. In the following pages we will study (1) the metals they used; (2) their metallurgical skills; and (3) the sources of the metals used. At the present stage, the data are not adequate and a lot more work remains to be done. Our methodology and the technical data of the Harappan metal technology have been discussed in detail elsewhere (Agrawal 1971). We will briefly review the state of current research in this field and give only the main observations here.

Metals Known To The Harappans

Gold And Silver: Gold has been used extensively for making ornaments, etc., by the Harappans. The forms encountered generally are beads, armlets, pendants, needles, conical caps, brooches, etc. The gold used is rather pale in colour and it has been suggested that quite often it was used as electrum (mixture of gold and silver). A significant use of gold appears for the first time only with the Harappans.

Silver, in protohistory, seems to have been confined to only the Harappans—it neither appears before them nor after them. The only exception is the Gungeria hoard of thin silver plates. Rao (1973) erroneously holds the view that silver 'was used sparingly' by the Harappans. Silver has been extensively used by the Harappans for making vessels, beads, buckles and ornamental devices. It is certainly more prolific than gold. Electrum was quite commonly used by the Harappans.

Lead, Arsenic, Antimony And Nickel: We define deliberate alloying here as addition to more than 1 per cent of the alloy metal to copper; lesser amounts may be due to impurities in the ore itself. Lead (1-2%) was used mainly to increase the fusibility of copper while casting. At Mohenjo-daro, 6 per cent of the tools indicate lead alloying (lead content varying from 1 to 32%). Cerrusite (a carbonate ore of lead) has been reported from the Harappan sites. Sanahullah suggested its use for cosmetics also. Galena ore has been recorded at Mohenjo-daro.

Lollingite, an arsenic ore, has also been reported. Arsenic was used to increase the hardness of artefacts by alloying with copper. Even 1 per cent arsenic increased the hardness of copper from 124 to 177 (Brinnel Hardness [B.H.] nos.). About 8 per cent tools from Mohenjo-daro indicate arsenic alloying in the range of 1-7 per cent. The small percentage of arsenic alloying may be due to their ignorance about its effect on hardness. It is possible that the Harappans used it only as a deoxidiser for copper castings.

Antimony is probably present only as an impurity, as it is generally less than 1 per cent; only in very rare cases does it exceed 1 per cent, but is less than 2 per cent. It is obvious, therefore, that its use was non-intentional.

Though nickel is common as an impurity in the Harappan artefacts, its deliberate use is attested to only from Rangpur and Mohenjo-daro. Three artefacts from Rangpur show nickel from 1.8 to 5.8 per cent whereas at Mohenjo-daro only seven tools have it (out of 177 analysed) in the range of 1-9 per cent.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

TIN: The limited evidence that one has so far, indicates that there was not much tin-alloying resorted to in the pre-Harappan times. The Harappans were using alloying quite extensively, more so in the upper levels. Out of the 20 artefacts from Harappa analysed by Prakash & Rawat (1965), nine indicate tin-alloying in the range of 3.6 to 10.45 per cent. Out of the 177 artefact analyses reported from Mohenjo-daro and Harappa, 30 per cent show tin-alloying.

Artefact percentage	70%	10%	14%	6%
Tin content	1%	8%	8-11%	12%

Tin varies from 2.6 to 11.07 per cent in seven tools out of 13 analysed from Rangpur.

For optimum ductility and hardness, 8-12 per cent tin should be mixed in copper. But one finds that only a small percentage of tools is in this range which may suggest that the Harappans either did not know the optimum range or could not control correct mixing. However, they restricted tin-alloying to artefacts which were used against hard surfaces, e.g., knives, axes and chisels.

COPPER: Copper, of course, was the most extensively used metal by the Harappans. It has mostly been used in unalloyed form. Of the reported analyses, 70 per cent indicate no alloying. The main tool types are: razors; chisels, knives, barbed arrow-heads, spear-heads, celts, hooks, saws, tubular drills and mid-rib swords. It is to be noted that the first true saw appears in Harappan times, which does not recur again till the Roman period. Bronze sculptures are represented by the dancing girls from Mohenjo-daro and also by animal figurines of dog, elephant(?), bull, swan, birds, etc.

TECHNOLOGY

SMELTING: There is very little direct evidence for the type of ores used and the smelting processes employed by the Harappans. The discovery of large quantities of copper oxide ore from a brick-lined pit from the DK area of Mohenjo-daro may indicate its probable use for extracting copper. In the DK area, again, two mud-lined pits of wedge-shaped bricks were found. The vitrified bricks may indicate the use of these pits as furnaces. Assuming that Friedmann's (1966; Bowman *et al.* in press) approach is correct, we can infer the type of ores used by the Harappans by doing probability calculations on the basis of the concentrations of silver, arsenic, iron, bismuth, lead and antimony in the copper artefacts. (For technical details, see Agrawal 1971). We will discuss the probable use of ores in Section 3.

ALLOYING: We have already discussed alloying in brief while discussing the various metals.

The Harappans used various metals like tin, nickel, arsenic, for alloying copper. Alloying increases the hardness of the metal, but a higher percentage (more than 12% of tin, for example) makes the object brittle. Therefore, to obtain an optimum of strength and ductility, tin has to be mixed in the 8-12 per cent range only. We, however, find that only 14 per cent of the tools were in this range of 8-12 per cent tin. Out of the 177 analyses, only 30 per cent showed tin-alloying. Obviously, non-alloying of the bulk of artefacts betrays the scarcity of tin.

The Harappans also used nickel, arsenic and lead alloying. Lead gives better fusibility. Arsenic could have been used as a deoxidiser for closed castings, or may have been added to increase hardness.

At Mohenjo-daro, in the lower levels, only 6 per cent of the tools were of bronze, whereas these were 23 per cent in the upper levels. At Rangpur, 7 artefacts show tin-alloying and 2 nickel-alloying.

Fabricating Techniques

FORGING-FABRICATING: Most of the objects seem to have thin flat sections, e.g., razors, arrow-heads, knives, spear-heads, saws, etc. These could have been chiselled out from sheets of copper. The thin tubular drills are so finely made that use of a mandrel to hammer a jointless cast-ring is clearly indicated.

By cold hammering, the hardness of an artefact can be considerably increased (from 87 to 135 B.H. nos.). This technique was used by the Harappans, as is indicated by metallographic analyses of the Harappan objects. But too much of cold hammering makes an object brittle. To make the metal malleable and ductile again, it has to be re-heated (annealed). The Harappans made use of this property as indicated by the polygonal grains and twinning in the metallographic sections of the artefacts. Today, most

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

commercial annealing is done at 590°C—this does not allow any undue grain growth but makes the metal soft.

Copper can be worked at high temperatures—upto 1050°C. But such hot work does not increase the metal's hardness, ductility or strength. Of course, it does increase the density of the metal by closing up gas holes and pores, and refines the coarse grains.

The Harappans used a large variety of pots and pans. Compared to the early Chinese bronze vessels, these were nowhere in complexity and decoration, but were simple utilitarian pots. Generally, the Harappans were using *sinking* and *raising* to beat the metal disc and shaping it into desired pot-forms. Essentially, *sinking* is beating the metal from inside into a depression and *raising* means beating it externally on a dome-shaped wooden anvil.

Though Mackay thought that *spinning* and *turning* were also used, it does not look very probable. Essentially, these are modern techniques and require the use of a lathe which could not have been invented in the third millennium B.C.

Casting: Generally, casting can be done in three ways: in open moulds; in piece- or closed moulds; and by the *cire perdue* method.

A large number of flat axes and other flat objects from the Harappan sites indicate the use of open flat moulds. From Chanhu-daro, open stone-moulds have been reported. Generally, for moulds, fine grained argillaceous sandstone or soapstone were preferred as they do not change at high temperatures. Puckered-surface axes from Chanhu-daro (Mackay 1943: pl. CXX, 27) and those with many blow-holes from Mohenjo-daro (Mackay 1937-38: pl. CXXII, 36, 40) may show use of blister copper and bad casting. Such tools may not have been of much use.

Objects like fish-hooks, chisels and mid-ribbed swords were obviously cast in closed moulds. Even the birds and animals may have been cast in such moulds.

But for figures like that of the dancing girl, only the *cire perdue* method seems to have been possible. We have two such figurines from Mohenjodaro.

Joining Methods

Today, three welding processes (pressure welding, surface welding and fusion welding) are known, but perhaps these were not resorted to in Harappan times. However, the Harappans used a number of other techniques. *Lapping* is a technique by which two parts (say of a vessel) can be placed one above the other and joined. This was probably used by the Harappans, for example, for joining tubular handles (Mackay 1937-38, pl. CXXII). Cleaned parts could also be joined by pouring molten bronze over them. Several vessels from Mohenjo-daro, in Sanahullah's report (Marshall 1931) show signs of *running on*, as this process is called. Short rods of metal hammered on both ends (rivets) were used to join various metal parts. Both Childe (1957) and Marshall (1931) have reported *rivetting* in the Harappan artefacts. In *soldering*, one uses an alloy different from the metals to be joined. The advantage is that one can join at a much lower temperature than the melting point of either of the metals to be joined. However, no case of copper soldering has been reported from the Harappa Culture, though gold and silver-soldering have been reported.

Ores And Mines

Non-cuprous Ores: In the whole range of prehistory, the Harappans alone used silver most extensively, not only for ornaments but also for large vessels. The source of silver is anybody's guess. Rao suggests both the Kolar (Karnataka) and the Jawar mines (Udaipur).

For gold, the Kolar and Hatti gold mines of Karnataka seem to be probable sources. The only ^{14}C date for the Kolar gold mine so far, however, goes back to only 1500 plus 115 BP (TF-879). Rao (1973) says that the occurrence of disc steatite beads in several neolithic sites may indicate some Harappan contacts, which was quite feasible on chronological grounds. The discovery of Neolithic sites near the gold mines may support the suggestion that the neolithic people supplied gold to the Harappans. Of course, many big rivers of India bring gold in their sands and it has been washed since very early times. A lead ore (TF-Cu-5) from Mohenjo-daro was analysed by us but showed only antimony and lead. Though lead ores occur at several places in India, the Jawar mines (Udaipur) seem to be a more likely source.

Tin has been scarce in India, though tin ore deposits are known from Hazaribagh area in Bihar, Banas-Kantha in Gujarat and Dharwar in Mysore. It has been suggested that steam tin (cassiterite)

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

was exploited for alloying. It is also possible that tin was obtained from the Khorasan and Karadagh mountains.

Today, the arsenic ores—realger and orpiment—are imported, though some occurrences have been reported from Rajasthan, Bengal and Bihar. It is difficult to guess from where the Harappans got it. A piece of arsenic ore (lollingite) from Nal was analysed. It gave 49.3 per cent Fe, 43.6 per cent As, 0.7 per cent Cu, 0.16 per cent S, but the source could not be determined.

COPPER ORES: The source of copper in the Indus Civilization is quite a controversial issue. There are those who believe that the Harappans exported copper; on the other hand, there are those who think that copper was imported by them. Let us analyse the problem from its essentials.

First we should see if one can identify the types of ores used by the Harappans. Then one can look for probable ore-sources in adjoining regions and also for evidence to locate the mines used.

As explained earlier, if one uses Freidmann's (1966) approach, one can identify the ore-types used by studying the concentrations of Ag, As, Fe, Bi, Pb and Sb in copper artefacts. We used his techniques and came to the conclusion that the Harappans not only used native copper but also oxide and sulphide ores. There is no evolution of techniques to be traced, as use of sulphide ores is indicated even in the lower levels. This can mean only one thing that they had the full knowledge of smelting of sulphide ores, right from the beginning. We found that, at Harappa, the probability of the use of oxide ores (e.g. malachite) is very high. Generally at Mohenjo-daro, oxide ores and native copper were probably in common use. As mentioned earlier, large quantities of copper oxide ore were recovered from a brick-lined pit from Mohenjo-daro. Such use of native copper and oxide ores is an indication of the use of fresh mines.

The second question relates to the probable ore bodies which could have been exploited by the Harappans.

The main types of Indian minerals are: chalcopyrite, cholocite, bornite, tetrahedrite, malachite and azurite.

The main modern mining ores are located in Andhra, Bihar, Kumaun and Rajasthan. The Singhbum (Bihar) belt is very rich: the estimated reserves are 3.8 million tonnes of copper ore. In Rajasthan, there are mines in practically all the divisions. The Khetri belt in Jhunjhunu district is some 80 km. long, with 28 million tonnes of ore reserves in the Mardan-Kudan section alone. Generally, chalcopyrite is found in these places.

Sanahullah (1931) suggested a number of sources from Baluchistan (Shah Ballaul, Robat, etc.), Afghanistan (Kalihzeri and Shah Maksud) and Persia (Anarak) for the Indus copper. Similarly, other archaeologists have suggested various other sources.

But the antiquity of these mining areas, as known today, does not go beyond historical times. Srinivasan (personal communication) has traced the antiquity of the Khetri workings to the Mauryan times, which is supported by a C^{14}date TF-1117, 360 ± 105 B.C .,for the Dariba mines. For some workings at Kumbaria in Gujarat, we have two C^{14}dates, viz. TF-1221, 535 ± 90 and TF−1222, 905 ± 85 B.P.only.

The other possible way of identification is by comparing the trace impurity patterns of ores and Harappan artefacts. Table 18.1 shows the trace impurity pattern comparison of various ores and Harappan artefacts to determine ore-artefact correlations. It is obvious that only Khetri ore has the closest similarity with the Harappan artefacts, thereby indicating the possibility of the use of Khetri ores. Geographically too, it looks quite probable. But to prove it beyond any shadow of doubt, one will need to do a much larger number of samples.

The West Asiatic cuneiform records mention that copper, besides other articles, was obtained from Meluhha which is generally identified with the Indus region. '. . . Documents show that in the twentieth century B.C. seafarers were bringing to Ur gold, silver, much copper, lumps of lapis lazuli, stone-beads, ivory combs and ornaments and inlays, eye-paint, wood and perhaps pearls' (Wheeler 1968). But Rao (1973), on the basis of superficial similarities between the Lothal ingot and those from Susa, derives its source from there. His claim is also based on the absence of arsenic in the Lothal ingot. There are a large number of Harappan artefacts where no arsenic is reported (Prakash & Rawat 1965; Mackay, 1937-38) and therefore, the absence of arsenic is not distinctive at all.

All these considerations tend to show that the most likely source of the Harappan copper was the Khetri belt.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Here it may also be added that the Harappan culture was richer in copper than all the other chalcolithic cultures, including perhaps even the Copper Hoard Culture.

REFERENCES

Agrawal, D.P. 1971. *The Copper Bronze Age in India.* Delhi.

Bowman, R. Friedmann A.M., Lerner J. and Milsted, J.A. *Statistical Study of Impurity Occurrences in Copper Ores and their Relationship to Ore Types* (in press).

Childe, V.G. 1957. *New Light on the Most Ancient East.* New York.

Friedmann, A.M., *et el.* 1966. Copper Artifacts : Correlation with Source Types of Copper Ores. *Science.* No.152; 1504.

Mackay, E.J.H. 1937-38. *Further Excavation at Mohenjo-daro,* Vol.I and II. Delhi.

———. 1943. *Chanhu-daro Excavations 1935-36.* New Haven.

Marshall, J. 1931. *Mohenjo-daro and the Indus Civilization.* London.

Prakash, S. and Rawat, N.S. 1965. *Chemical Study of Some Indian Archaeological Antiquities.* Lucknow.

Rao, S.R. 1973. *Lothal and the Indus Civilization.* Bombay.

Khan Sanahullah, 1931. In Marshall (1931).

Wheeler, R.E.M. 1968. *The Indus Civilization.* Third Edition. Cambridge.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

19

Yu. Knorozov, B. Volchok and N. Gurov

Some Groups of Proto-religious Inscriptions of the Harappans

It is common knowledge that upto the present time, it has not been possible to discover any single long proto-Indus inscription on any Indus or pre-Indus object, including seals. Nevertheless, the mini-inscriptions that have been discovered on Harappan objects are of exceptional interest and constitute a valuable source for the study of proto-Indian culture. Unfortunately, not all the inscriptions have been published, particularly the ones on ceramics. Further, old publications which were splendid for their time, are not at all up to the current standards of research. Many signs and depictions on photographic copies are indistinguishable: for instance, the 'standard' which occurs on hundreds of seals.

A small, but extremely interesting, group of inscriptions is represented by those which were impressed, with the help of special stamps, on vessels prior to firing. It is our surmise that the inscriptions consist of the names of a deity in the nominative case, or of a calendar block. Unfortunately, only a few have been published: for instance: X, CIV, 73 ; X, CII, 23, 46

It may be noted that the impressions of stamps found on the upper parts of vessels are usually inverted in order that they may be more easily read from above. To this group belong the inscriptions incised on the inside of the bottom of vessels. In their most minimal form, they may consist of the Protective Deity in the nominative case: for instance X,CII, 15 .Vessels stamped with the names of gods obviously were intended for use in particular rites and were dedicated to these gods. Judging by later analogies, it is quite possible that these vessels symbolized the gods in the rites, which explains the nominative case.

Besides this, there is a large, but virtually unpublished, group of inscriptions. It is composed of oblational inscriptions incised after firing the vessels which evidently served as containers for transporting various offerings to the temple. In their minimal form, these inscriptions consist of the name of the deity in the dative or in oblique cases, for instance Mackay, LXIII, 3 X,CII,6 (1938).

There is one more group which is particularly interesting, by virtue of the richness of its contents. It consists of oblational inscriptions on various relics, which, according to us, were distributed by the priests to those who came to the temple for the sacrifices. The nature of these relics, however, changed repeatedly. Originally, the worshippers probably brought leaves and twigs from the sacred trees. Later, to keep the trees from being plucked clean, they began to use sticks bearing oblational inscriptions. Some of these have been preserved (Mackay 1938: CX, 45,48,51,52; CXXV,9). In the lower or early strata of Harappa, the oblational inscriptions have been made on thin pieces of steatite. Finally, they began to use special stamps to impress the oblational inscriptions on clay tablets which were then fired. The switch over to stamped tablets made a number of significant improvements possible, all at once. The stamp was usually prepared by a skilled engraver, often with considerable artistic talent. The number of pictures which accompanied the inscriptions increased sharply. Impressions began to be turned out in great number, at virtually no expense to

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the temple.

In its most common form, the oblational inscription consists of the name of the deity and of the calendar 'block', indicating perhaps the time of the sacrifice. Sometimes one of these two main components is omitted, or it may happen that only the designation of the festival is given.

Oblational inscriptions were also impressed on clay tablets with two or more sets of stamps. According to us, the obverse was usually struck with the names of the deities, and the reverse with calendrical 'blocks' and symbols. In its simplest form, the calendar 'block' consists of a number, from one to four and the sign for a vessel (replaced sometimes by the signs for a worshipper bearing a vessel), which undoubtedly conveys a general sacrificial significance. The preceding number obviously indicates the ordinal number of the sacrifice (the first, the second, etc.) These numbers clearly cannot indicate the quantity of offerings, if one takes into account the fact that they are to be found in inscriptions made before the vessels were fired. Since this calendar 'block' is accompanied in a number of instances by the symbols of the six seasons, one may assume that the number indicates a sacrificial offering in one of the four half-months of the season.

These people, according to our understanding, divided the year into six seasons, each of which had two basic symbols (not including their names). The symbol of the season could be an animal, among which was a tiger, the defender of the fields. The heads of these animals (two of them stamped) are represented on the seal MI, 383: aurochs, antelope (?), goat (?), tiger, short-horned aurochs, and the bull. The seasons were also designated by vegetable symbols; these are, indeed, the bases of the standard. These symbols, unfortunately are completely indistinguishable in the photographs, represented on seal (Mackay 1938: 641.

It is significant to note that both the variants of the season-symbols accompany the oblational inscriptions, for example: Mackay 1938: LXXXII, I-2; and X, 315 unicorn; X, 429 goat; X, 677 (?), X, 314 short-horned aurochs and 342 bull; X, 659 bull.

Apart from the symbols of the six seasons, the oblational inscriptions are accompanied by various other calendrical symbols, representations of gods, and whole scenes connected with specific festivals. A fish and a crocodile occur most frequently of all, clearly symbolising the flooding of rivers.

The approximate calendar order of the chief festivals seems to be the following: the spring equinox, which is designated by the constellation Taurus and the six stars known as the Pleiads, connected with the flooding of rivers; the summer solstice, indicated by the constellation of the tiger (Leo); prayers to the tiger; sacrificial offerings to the bull; libations to the Tree of Rain; arrival of the ship of the great goddess before the monsoon rains; sacrificial offerings to the great goddess; festival of the snakes; autumn equinox symbolized by the constellation Scorpio; sacrificial offerings to the buffalo; winter solstice (the New Year).

We also feel that the festival of the New Year was connected with the form of the religious service that the officials made and consequently with teachings about the shifts in power among the gods. Evidently, in the course of the struggle for power between the competing clans, there was first of all an alternating government. And in order to secure an extension of their term of office (for which there were already economic grounds), the rulers used priestly teachings indicating that the 'year of the gods', as revealed by the stellar signs, was longer than the year of the mortals. As variations of the 'year of the gods' a five-year cycle which agreed with the movements of the sun and the moon, and the twelve-year cycle in agreement with the movement of the sun and planet Jupiter were evolved. Finally, a sixty-year cycle was introduced, a combination of the two previous ones, and the power was finally usurped by rulers from the 'Pratria' of the 'Buffalo': (the celestial king is represented with the head or the horns of a buffalo).

The oblational inscriptions connected with the New Year are accompanied by the representation of the king of the gods sitting upon a throne, surrounded by worshippers (Marshall 1931: CXVI, 29) or by the symbol of a year, i.e. a standard consisting of the symbol of one of the five twelve-year periods and the symbol of a year of the twelve-year cycle. Apparently, the symbols of the five twelve-year periods originally indicated the year of five-year cycle.

The years of the twelve-year cycle were indicated by symbols of the six seasons in the two variants, in which the second can be distinguished only by the addition of the dotted line. In

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the New Year's procession with four participants (Marshall 1931: CXVI, 5, 8) the symbols making up the standard are being borne separately.

A particularly curious group consists of inscriptions on the tips of spears and axes, which have, unfortunately, been badly published. This is the only group of inscriptions in which large numbers are designated. If we are to consider, as E.Mackay suggests, the sign as figure 10, then on the spearhead Mackay 1938: CXXXI, 39 and on the axe Mackay (1942) LXXIV, 1 the figures 11 and 35 are indicated respectively, that is the last years of the first and third twelve-year cycles. On the broad tip MII, CXXXI, 31 and on the axe Mackay 1938: CXXI, 35-36, the figures 19 and 76 are indicated, that is to say, the multiples of the Metonic cycle. These spearheads and axes evidently were among the appurtenances of the temple and were used for blood-sacrifices on specially solemn occasions. In the scenes with the buffalo (with the twelve-year rings on the horns) the killing is done only with the spear. In addition to this, the spear probably was the symbol of the divine spear-bearer who kills the buffalo.

The most intensive group consists of inscriptions on the seals with the standards; in other words, dated by a specific year of the sixty-year cycle. The standard is almost always accompanied by the symbol of the year, namely the unicorn (the best of the first season), with a 'heart-shaped' sign (the second symbol of the year) on its shoulder. The stamps were changed every year; apparently, first among the officials. The contents of the inscriptions require deep investigation, but in any case, one frequently encounters, among them, the names of the protecting gods of the years of the five-year and twelve-year cycles. It should be noted that one and the same god may be named differently.

REFERENCES

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro*. 2 vols. New Delhi.

———. 1943. Chanhu-daro Excavations. 1935-36. American Oriental Series. Boston: Museum of Fine Arts. New Havan.

Marshall, Sir John. 1931. *Mohenjo-daro and the Indus Civilization*. 3 vols. London.

TABLE 19.1: Spectroscopic Analyses of our Samples

Indian Ores and Artefacts

Sample Description	Ag	Fe	As	Sb	Pb	Bi	Cu	Sn	Ni	Zn	Mn	Co	Au	Al	Cr	Mo	Zr	W	Ti	Mg	V	Gd	P	Si
TF-Cu-14a Madras Pyrrhotite	nd	+	nd	nd	nd	nd	+	nd	+	+	nd	+	ns	nd	nd	nd	nd	+	nd	nd	nd	ns	ns	nd
TF-Cu-14b Madras Pyrrhotite	nd	+	nd	nd	nd	nd	+	nd	+	+	nd	+	ns	nd	nd	nd	nd	+	nd	nd	+	ns	ns	nd
TF-Cu-5 Mohenjo-daro Galena Ore	nd	nd	nd	+	+	nd	nd	nd	nd	nd	nd	nd	ns	nd	nd	nd	nd	nd	nd	nd	nd	ns	ns	nd
TF-Cu-15 Singhbhum Chalcopyrite	nd	+	nd	nd	nd	nd	+	nd	+	+	+	+	nd	+	nd	+	ns	ns	+	+	+	ns	ns	+
TF-Cu-24 Khetri Chalcopyrite	+	+	+	+	+	+	+	+	+	+	+	+	ns	+	+	+	ns	ns	+	+	+	ns	ns	+
TF-Cu-3 Chanhu-daro celt	+	+	+	+	+	+	+	+	+	+	+	+	ns	+	+	+	ns	ns	+	+	+	ns	ns	ns
TF-Cu-6 Mohenjo-daro spearhead	+	+	+	+	+	+	+	+	+	+	+	+	ns	+	+	+	ns	ns	+	+	+	ns	ns	ns

Key: + = Present
nd = not detected
ns = not seen

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

20

J.V. Kinnier Wilson

The Case for Accountancy

It is with much pleasure that I contribute these few pages to a volume which will be a landmark in the history of Harappan studies, and which is so fittingly associated with the name of Sir Mortimer Wheeler. It is particularly relevant to the present study that, under Sir Mortimer's chairmanship, I was privileged to read an introductory paper on 'The Indus script and Sumerian' during the Royal Asiatic Society's symposium on *The Undeciphered Languages*, held in London in July, 1973.

In fact, an expanded account of what was there attempted has since appeared in a short monograph (Kinnier Wilson 1974). The statement of the title should surely first stand on trial before any other of a like kind is attempted. But there is an aspect of the proposal which is largely independent of language. Its concern is simply with the purpose and function of the seals, and, since the offered solution does appear to explain much of the underlying archaeology in a most satisfactory way, it may be of interest to set down the essential ideas as a separate argument. In general, our concern will be housekeeping and the economy, but more particularly we may suggest that the seals and sealings—as also the 'miniature seals', inscribed potsherds and copper plates—have their place within a system of primitive accountancy.

The several steps in the argument which lead to this conclusion are presented below under seven individual headings.

[1] Attention may first be drawn to a basic study by A.S.C.Ross who, as long ago as 1938, wrote an important paper called 'The "numeral signs" of the Mohenjo-daro script'. In this study, Ross examined at length, supported by an impressive table, those signs in the script which are composed of short vertical strokes. He called these 'numeral signs'; and basing his argument on the high frequency of occurrence of these signs within the total number of occurrences of signs in the script, Ross concluded:

> It is quite possible that some of the signs here called 'numeral signs' may have no connection with numerals . . . But taking the numeral signs as a whole, it is quite inconceivable that there should not be represented among them signs having some connection with the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 12 (Ross 1938).

The above conclusion, namely, that the writing of the Indus script is, at least in some part, to be connected with numerals, is here accepted.

[2] From this position we turn to the consideration of a sign, here indicated as 'Q', which is seen to follow the presumed numerals on a large number of occasions. It consists of a straight vertical stroke crossed by an upward-curving 'arm' or crescent-shape, and its general appearance may be seen from the table provided by **fig. 20.1**.

Table

The table provides examples of 'numeral signs', the numbers reading from the top, being 3, 4, 5, 6, 7, 8, 9(restored), 10(proposed on the analogy of the Sumerian 10 which has the form of a circle), and 20 (proposed on the analogy of the Sumerian 20 which is expressed in the form of two independent circles) (Cf. Kinnier Wilson

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

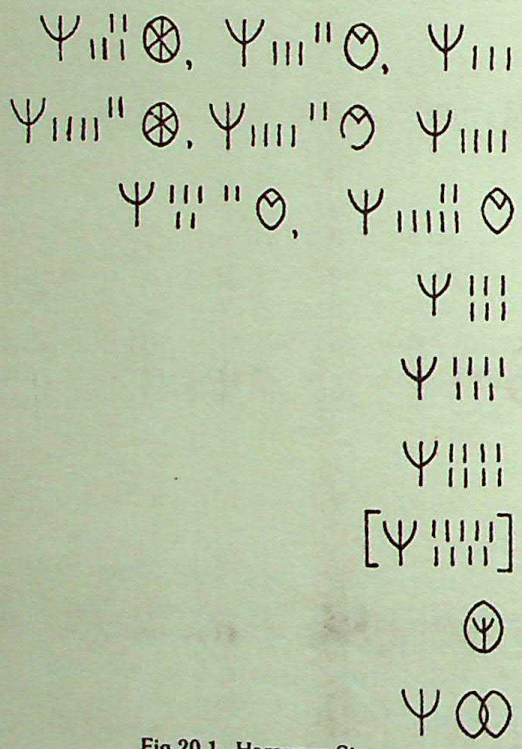


Fig.20.1. Harappan Signs

1974: 6 and 49). The signs which appear to the right of the numerals 3, 4 and 5 (that is, in the first three lines of the table) will not concern us in this study.

Since it is thus associated with numbers we take the "Q"-sign to be a unit of measure — most suitably a unit of measure involving grain — and some support for the idea is provided by the following text (Mackay 1938:II, no.322).

Table

In this text the sign of our interest is repeated four times. It will hardly represent the fourfold repetition of a spoken sound such as *bu-bu-bu-bu* or *pa-pa-pa-pa*, since no language has words of such a kind. Consequently, we infer that the sense is 'four times the unit of measure Q', or '4 Q'. And in this conclusion we may appeal also to the ligatured left-hand sign whose lower element has a strong resemblance to a pair of scales, and will then have indicated expenditure or 'weighing out'.

[3] We turn next to the archaeology of the sealings. In this connection, two matters are important. The first is that some of the excavated sealings indicate on their reverse, by impression on the clay, the materials to which they were once attached. 'In all, eight steatite seals and three terracotta sealings were recovered', writes the report on the final season at Lothal *(Indian Archaeology– A Review 1958-59,* 18), 'the latter bearing on the reverse impressions of cloth, reeds and cord'. Similarly, Mackay (1938: I, 349), refers to sealings found at Mohenjo-daro 'which were certainly once affixed to matting or a rough textile'.

The second point which we must consider is, in a sense, almost the reversal of the first. It is the recognition that complete sealings have been found which are altogether innocent of any marks of cloth or other attachment. For this assertion the essential reference is again Mackay (1938:I, 349), now quoted in full. The passage reads:

Fig.20.2 Harappan signs

Though sealings have been found which were certainly once affixed to matting or a rough textile, it should be understood that only seven of the objects under discussion come into this category. The rest were never attached to bales or anything else, nor did they serve to mark merchandise.

We believe that no solution to the seals can be considered as correct which does not recognise the problem of the two kinds of sealing.

[4] It is at this point that a way forward may be suggested. In Mesopotamia, thousands of texts from both Sumerian and the later Akkadian times, and from many sites, bear witness to the work of accountants and accountancy. Without them, the whole operation of the distribution of provisions and materials from the central collecting points of the controlling organisations would have been impossible to manage. We similarly believe that the Indus Civilization had to face the same problem, and the evidence leads us to the following simple reconstruction. For every item of expenditure two identical records would have been made. One would have accompanied the items leaving the magazines; it would have been a kind of 'label', and the damp clay would often have picked up the weave of the cloth or sacking, etc., to which it was attached. The other, a printed duplicate stamped with the same seals but otherwise unmarked, would have been kept in a basket (or other container) in departmental archives until the end of the accounting period. At that time the adding together of all such records would have given the accountant the total

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of his outgoings for the period.

[5] A variant of this system, most probably of an earlier date, has now to be admitted into the reconstruction. This involves the so-called 'miniature seals' discovered at Harappa; they carry a few signs only, written on two, or occasionally three, faces, and a numeral seems invariably to have been present. They were not, however, seals in the accepted sense, for, as Vats (1940: I, 325) himself remarked, the writing is in all cases too thin and shallow to permit of the making of impressions. Accordingly, these stones will not have been inscribed with the mirror-image of the signs as in the case of the genuine seals, and what we would suggest is that they were used somewhat as 'tallies', although again in the recording of outgoing expenditure. This means that, as with the sealings, the accountants will have placed the appropriate stone in his jar or basket relevant to the expenditure, while the corresponding labelling will probably have been done by the use of potsherds. An advantage of this system is that the tallies could have been used all over again at the end of each accounting period. The writing of the potsherds is often crude and inelegant, which accords well with the idea that they were only designed to be used once.

[6] We have yet to introduce the copper tablets into this reconstruction. These tablets were found 'in considerable numbers in buildings of the Late Period' (Mackay 1938:I, 363ff.), although only modest numbers have been published owing to difficulties of reading and copying. What is significant about them is that they do, in fact, carry signs which are represented also on the seals, but the simple numerals occur less frequently and appear rather to be replaced by numerals of higher denomination. This suggestion has in some part been already developed (Kinnier Wilson 1974), and, if correct, it allows us to suppose that the copper tablets preserved in permanent form (and hence the use of a metal) the periodic totals of outgoing expenditure recorded for the individual accounting periods.

Thus may the five main components of the archaeological picture — the labels, the duplicate impressions, the tallies, the inscribed potsherds and the copper tablets—be incorporated within a single scheme of solution.

[7] The argument requires finally a theory regarding the real nature of the information provided by the Indus writing. Necessarily, from the findings of arguments (1) and (2) such a theory should support the proposal that numerals, a unit of measure and perhaps also a statement of expenditure were involved to some part in the communicated information.

We may solve the problem by examining an aspect of accountancy in ancient Mesopotamia. It was in fact a doctor of law, Paul Koschaker (1942) who first realised that references to 'silver' in second millennium documents from Babylonia had nothing to do with either buying or selling or prices or payments, or indeed even silver itself as such. The silver simply represented a convenient standard whereby, for book-keeping purposes, all kinds of distributary operations could be recorded under a single denomination. A number of texts from Larsa were discussed in this connection, and in one of these—to cite a single example—Koschaker noted that a consignment of fish, dates, wool and onions had been accounted as the equivalent of 2/3rds of a *mana* and 3 *shekels* of silver, and registered accordingly. No quantities were specified in connection with these items, nor were any further details given. It was the total reckoning in silver which was deemed important.

It is this picture, in general outline, which may now be advanced to explain the main purpose and function of the Indus seals. We believe, in fact that the accounting standard may normally have been grain rather than silver—the arguments for this conclusion are developed in the longer study—but we believe nevertheless in an economy of controlled income and expenditure, the former being rather theoretical (because no labelling was required), but the latter being well authenticated by the sealings and such texts as we have discussed. In other words, we visualize a system whereby everything which formed part of the civilization of the times—be it foodstuffs, textiles, woods, metals or minerals—will have gone forth to wherever needed from the central collecting points, although all that we are actually permitted to see of it are the accountants' recordings in terms of 'grain-equivalencies'. It is this latter word, as we believe, which contains the whole answer to the problem that we are investigating. Moreover, the fact that we have been unable to isolate within the texts any sign-groups

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

which might suitably qualify to have been names of individual commodities goes some way to support this general line of approach. On the tallies, in particular, there is simply no room on the available space for any kind of specifying of items to have been undertaken.

Fig.20.3. Harappan signs

In conclusion, two further matters may briefly engage our attention within the theory proposed. The first concerns the animal devices of the seals which we bring into the argument by supposing that they were the symbols of the issuing authorities at different periods, even possibly of individual rulers who, since only luxury items will have come in by trade, will have largely ingathered their total income by means of taxation or feudal agreements with their own peoples.

Our second point accepts the fact that other scripts and writings, including early Sumerian writing, Mycenaean and even proto-Elamite (which is known to incorporate a numerical element) have all to do with book-keeping in one form or another, so that, in suggesting the same for the Indus script, we are simply admitting that parallel civilizations have necessarily to be administered along broadly similar lines.

Thus with a strong argument from the comparative approach to the study of ancient culture, we conclude the case for accountancy.

POSTSCRIPT (MAY, 1981)

The death at the age of 73 of Alan Ross, until recently a Professor in the Department of English at the University of Birmingham, England, was announced in the British national press on 26 September 1980.

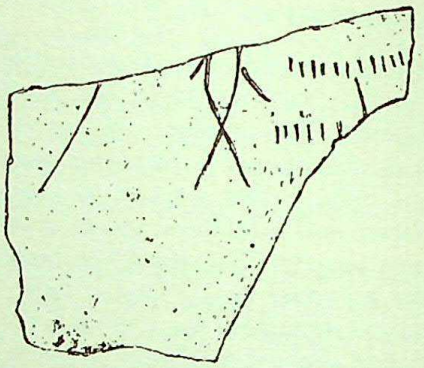


Fig.20.4. Harappan signs

It is not perhaps sufficiently known that Ross made a life-long study of numerals. His particular interest was in the numerals and numismatics of the Classical world, and for many years he had been working on an extensive philological sutdy in which the names of the numerals of all the Indo-Iranian and Indo-European languages would be included. As I have learned recently from Sir Harold Bailey (who contributes a section on the Sanskrit numerals) the manuscript was completed about a year before Ross died, and may be published in Germany.

As one who shall always believe that 'That "Numeral-signs" of the Mohenjo-daro script' was a seminal paper of the greatest significance for Harappan studies, I should first like to pay a small tribute to its writer by setting down a revised table *(a)* of the numerals 1 - 10 in the Indus script when these are coupled with the simple fish-sign as 'determinative'. This table achieves a greater degree of homogeneity than its predecessors, partly because of the incorporation of a new '5' symbol (cf. Kinnier Wilson 1974 : 19; Koskenniemi, Parpola and Parpola 1973: 58), and partly because of the inclusion of a possible new '9' symbol (from Balakot, courtesy of Prof. George Dales, as yet unpublished). It may be added that the relevance of the fish-sign with numerals is altogether upheld by the previously mentioned potsherd from Amri (cf. Casal 1969: 171) which is now reproduced as *(b)* below the table. It is difficult to think that the 17 or more strokes shown to the right of the fish-symbol will not have indicated a numeral.

But additionally there is one matter which I

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

should like to put in a better perspective in the light of the review of my *Indo-Sumerian* by E. Sollberger (1976: 183-4). This relates to the so-called 'scales-sign' referred to earlier in this paper, and what may now be called the 'jar-sign', whose numerous occurrences are listed in the Helsinki *Concordance* under No. 325 (cf. Koskenniemi *et al* 1973: 391-452). These signs are found at the (left) end of the two seal texts reproduced under *(c)*.

I believe now with Sollberger that the jar-sign will not have been a word-divider. But if the scales-sign means 'to weigh out', the jar-sign may have meant 'to meausre out', and it happens that, in Sumerian, the sign *ág* with this meaning has a jar shape in its early forms. The effect of this proposal would be to strengthen the idea that both 'grain-equivalence' and 'metal (silver?)-equivalence' might be involved in the accountancy, and Sollberger is certainly right to point out that, at least in Sumerian times, silver and grain were respectively 'weighed' and 'measured' and so require separate verbs. However, at some time—as I now suggest—the two scales of equivalencies became inter-related and were made one, perhaps as a measure of economic convenience. Of three lines of evidence which could support this conclusion, there is firstly the argument that if the texts under *(d)* may demonstrate that the crescent shape was a form of the numeral '5', the pair of texts under *(c)* are then seen to run closely parallel, although the end verbs are different. Secondly, the two verbs were commonly ligatured one above the other, as in Sign No. 5 of the *Concordance* and as seen also in the left-hand sign of Mackay, No. 322 (reproduced above, **fig. 20.2**), almost as if there was an element of choice in the selection of the verb. Thirdly, and again with reference to the first pair of texts marked as *(c)*, it may be suggested that the unit-of-measure sign (second from the left) is preceded by a unit-of-weight sign (third from the left), the square base of the latter sign being possibly a representation of those cubic stone weights of which many have now been found (cf. Marshall 1931: Chap. XXIX; Vats 1940: 360-366). The latter proposal would then replace that advanced in my earlier work (1974: 18) where the sign was interpreted as a form of the numeral '1'.

In conclusion,—and if Sumerian may, after all, make a brief reappearance in this account—it

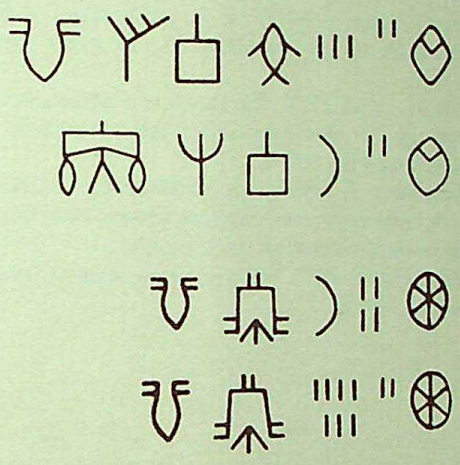


Fig.20.5. Harappan signs

may be said that, with Sollberger (1965 : 183), I have no faith in the existence of 'Sumerian settlers' in India, and the only theory which at all meets the language hypothesis is to suppose that the Harappan peoples *were* the Indo-Sumerians. The argument would then be that two branches of the one family separated at a time when city life and certain technical skills were already established, although writing was not (beyond possibly the use of numerals and some basic and agreed signs). On this basis the *ur* or *uru* meaning 'village', 'town' or 'city' in many Dravidian languages (cf. Burrow and Emeneau 1961 : No. 643) would have been a loan-word from 'Indo-Sumerian', and the confederacy of 'Seven Cities' called Bad-imin (or indeed possibly also Imin-bad, since there may be a question as to the correct order of signs) which I have thought to find in both Sumerian and Indo-Sumerian (Kinnier Wilson 1974 : 5ff.) would have been a native term and not a translation. Moreover, I would now argue (cf. ibid., 20) that Indo-Sumerian *retains* the old subject-element *-am* as against the *-e* which it had become in Sumer at a time contemporary with the Indus seals.

However, this proposition has nothing to do with accountancy, and may preferably be left to another generation of scholarship for its proper evaluation.

REFERENCES

Burrow, T. and Emeneau, M.B. 1961. *A Dravidian Etymological Dictionary*. Oxford.

Casal, J.M. 1969. *La civilisation de l'Indus et ses enigmes*. Paris.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Kinnier Wilson, J.V. 1974. *Indo-Sumerian: a New Approach to the Problems of the Indus Script.* Oxford.

Koschaker, Paul 1942. Zur staatlichen Wirtschaftsverwaltung in altbabylonischer zeit, zeitschrift fiir Assyriologie 47. 135 ff.

Koskenniemi, S., Parpola, A. and Parpola, S. 1973. *A Concordance to the Indus Inscriptions.* Materials for the study of the Indus script 1; Helsinki.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro,* Vol. II.

Marshal, John 1931. *Mohenjo-daro and the Indus Civilization,* London.

Rao, S.R. 1957. The Excavations at Lothal, *Lalit Kala,* Vol. 3-4; 42-9.

Ross, A.S.C. 1938. The Numeral-signs of the Mohenjo-daro script. *Memoir Archaeological Survey of India,* No. 57.

Sollberger, E. 1976. Review of *Indo-Sumerian. Bulletin. the School of Oriental and African Studies.* Vol. 32.

Vats, M.S. 1940. *Excavations at Harappa,* New Delhi.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

21

Asko Parpola

Interpreting the Indus Script

The decipherment of an unread script may to some extent be compared with the filling in of a crossword puzzle. The greatest difficulties are experienced in the early stage when there is no certain starting point. Guesses must be made on the basis of the available clues; just as in a crossword puzzle one has to start with the given definitions and word-lengths. A solution to a crossword puzzle is only tentative, remaining uncertain as long as it is isolated. It gains validity only when the word concerned fits the requirements and is crossed by other solutions in the grid, and the certainty of a particular answer is, of course, in direct ratio to the number of such internal confirmations. Incorrect guesses are also made, but these are generally revealed by their incompatibility with other contiguous words: mistaken suggestions block further progress and call for revision.

2 The three preliminary reports that our Finnish research team published a few years ago, in 1969, document our initial steps on this path of trial and error in attempting the decipherment of the Indus script. In the years that have passed we have devoted ourselves to epigraphical and statistical work, compiling more adequate research tools. A concordance to the pair-wise combinations for the Indus inscriptions, published in 1973, forms the first volume of a series of *Materials for the Study of the Indus Script*. At the same time, I have also tried to develop our theories of interpretation further, with due regard to all useful criticism. It is difficult to give an adequate idea of the present situation within the limits of this short paper, especially since it should comprise both the methodology employed and the concrete results achieved. Yet I have tried to squeeze into it everything that I consider essential.

3 Before an interpretation of the Indus script can be accepted as valid, it must flawlessly fulfil a number of requirements. This is true both of the individual interpretations and the theory as a whole. At least the following principles seem essential. The interpretation must fit in with all available evidence and give it a meaningful explanation. It must be in agreement with the body of accepted knowledge, especially the history of writing, linguistics, history, archaeology, and anthropology. It must be systematic and consistent, and testable using objective and, as far as possible, independent means. In the absence of bilingual texts, the most important tests — which must be made as demanding as possible — are provided by the internal evidence of the ligatures of which the interpreted sign perhaps makes a part, and the various contexts, notably compound words, in which deciphered signs occur side by side. The effectiveness of this control depends on the number of such convergences (§ 1). The principle of homo- and polyphony (which means that a number of signs may have the same phonetic value, and that one and the same sign may have a number of different phonetic values) to a large extent in the Near East is the result of successive borrowing of the same writing system by peoples speaking different languages, cannot be accepted as a working hypothesis: it would annul this internal control, and the stability of the sign combinations throughout the period when

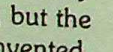
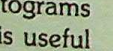
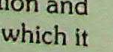
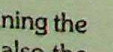
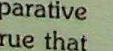
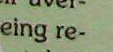
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the Indus script was in use rules out language shift. Another sort of test is provided by the cultural context of the inscriptions, both within the Indus Civilization and its historical framework: we have all sorts of external evidence with which the results must be in harmony.

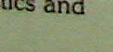
4 The earliest specimens of the fully developed Indus script date from *ca.* 2500 B.C. Including all ligatures, around 400 different signs are attested. Hence, the Indus script appears to be in principle of the same type as the other known writing systems of the third millennium: it seems to represent the first phase of phonetization, in which pictures of concrete objects are used *both* for the names of those objects *and* for other, *homophonous* words with entirely different meaning. This means that if one takes as the starting point those cases where the rebus principle is used, the script can be deciphered if three conditions are fulfilled: 1) the intended meaning can be determined from the contexts, 2) the object depicted by the pictogram concerned can be identified, and 3) the language underlying the script, in which words for these two meanings are close homophones, can be identified as one sufficiently well-known from other sources.

The Indus script does not bear such a close resemblance to any other known script that it could be proved to be genetically related with that script. At the moment it seems most likely that the idea of writing came from Elam, but the actual script was independently invented. Nevertheless, a comparison of the pictograms with those of the other writing systems is useful for the determination of their pictorial meaning. Very important for this aspect of the problem are also the graphic variants of the scripts itself (which are shown to be allographs of one and the same grapheme by wholly or almost identical contexts) and the art of the Indus Civilization and the preceding 'Early Indus' cultures from which it has evolved.

5 The most important means for determining the intended meaning of the signs and partly also the language of the inscriptions, is a comparative analysis of the texts and the signs. It is true that the Indus inscriptions are very short (their average length is five signs) and one-sided, being restricted to a few categories, but the fact that they contain much repetition with slight variation is favourable for a structural analysis. As preparatory work, compilation of all sorts of statistics and indices concerning the frequencies of the individual signs in various positions within the inscriptions and their pair-wise and other combinations is needed. Two tasks are particularly crucial: the division into words (the word-borders have not been marked in the Indus texts as they have in many other ancient scripts) and the isolation of inflexional elements. (I am not going here into the long-proven direction of writing, which is generally from right to left). In order to carry them through successfully, one has to have certain methodical principles.

As far as the word division is concerned, one must start from comparing entire inscriptions which can be presupposed to make semantically complete units: in key positions are the short inscriptions consisting of only two or one sign(s). For instance, combined with the observation that the sign concludes most of the inscriptions, the inscriptions 5031 and 3429 respectively of my concordance establish a word border in the inscription 1053 and 3325. Starting from such cases it may be concluded that, for example, the sign forms an independent lexeme in inscription 2338  (cf. 2048 ) and not a dependent grammatical suffix. This conclusion is reinforced by the parallellism between and in inscriptions like 3026  and 3615  [1052  ; 3325 ]

6 Some of the most important criteria for identifying signs used as inflectional elements are: a great frequency, a stable position before or after the "stoms", occurrence in connection with many different signs, and paradigmatic alternation with other possible inflectional signs.

The most frequent sign of the Indus script is , the occurrences of which make about 10 % of the entire material. It is, as a rule, found at the end of the inscriptions. In the case of the medial occurrences, it can almost invariably be shown to belong to the end of the preceding word. Only one single occurrence out of the total of some 1,300 seems to be attested in the beginning of an inscription. Most students of the Indus script have regarded this sign as a grammatical ending, and particularly as a possessive case suffix. In those cases where an independent word (§ 5) follows a word that ends in this hypothetical genitive suffix, it seems to alternate with a ∅-suffix having the same function, cf 2244  : 2281 : 1096 . On the other hand, the sign alternates paradigmatically at the end of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

many different words with the sign 𒀀, which also has a relatively high frequency, and is, next to the sign 𒀸, among the most common signs at the end of the inscriptions. cf. 3143 𒄑𒀸𒁹𒁹 : 1551 𒀀𒁹𒁹"𒁺 , or 1053 𒍣𒀸𒁹𒁹 : 3362 𒀀𒁹𒁹 . these two signs, 𒀸, 𒀀 are among the most obvious candidates to be identified as grammatical elements.

Other most probable grammatical markers are the short vertical strokes 𒁹, 𒁹𒁹 and 𒁺, raised in the upper register of the writing space, which most often follow the first sign of the inscription (which probably, to judge from its frequent omission from parallel inscriptions, is an attribute) and may alternate with each other: cf. 𒁺𒁲 (total frequency of the combination) 17: (in initial position) 13: (final) 1: (isolated) 0: (medial) 3: 𒁹𒁲"𒁲 77 : 71 : 1 : 1 : 4; 𒁺𒁲 20 : 19 : : 0 : 1 : 0. There are a few cases, like the following, in which the word ending in such a "grammatical" stroke sign is followed by the most common suffix sign 𒀸, apparently used here as the possessive case marker: cf. ξ5 and 3467 𒄑𒀸𒁹𒁹 : 1057 𒍣𒀸𒁹"𒁺 : 3441 𒁹"𒁺 : 1386 𒄑𒀸"𒁺.

There are a few signs which also often precede certain words, notably the signs 𒌅 and 𒁁, which may occur side by side as 𒌅𒁁 (cf., e.g., *Concordance*, p. 40 ff.). From such case as 2555 𒀀𒃻𒁹𒌅"𒁺 :2539 𒀀𒃻𒁹𒀸𒌅"𒁺① it appears, however, that these signs (which in 1217 𒀸𒁁 and 3726 𒀸𒌅"𒁲 are independent words) are not prefixes but apparently attributive first members of determinative compounds. There seems to be no evidence of real prefixes.

7 It is important to observe that the hypothetical genitive suffix 𒀸 is, as a rule, followed by independent lexemes (marked below with Z) at the end of inscriptions (cf. 5) when it is immediately preceded by those signs (marked below with Y) that immediately precede the hypothetical suffix 𒀀. Most of the inscriptions, however, end in the suffix 𒀸, without anything following after it (although the sign and some other rarer signs may at times be seen after it even in these cases, as also after the sign 𒂍): these "normal" inscriptions usually also contain signs belonging to the group marked with Y, but between them and the suffix 𒀸 (never 𒀀) there is a sign belonging to a different group (marked below with X). In the beginning of an inscription there may be signs belonging to still another group, which in all likelihood are attributes (𒁹"𒁺 , 𒁹"𒁲 etc.) but since they seem to be optional they are ignored below in the following classification of the inscription types which covers the majority of the material:

type	examples			
1: (𒂍)𒀸XY	3670 𒀸𒁹𒁹		3314 𒀸𒁹𒁹"𒁺	
	1142 𒀸𒄑𒀀𒁲"𒌅𒅆𒁺		3440 𒂍𒀸𒁹𒁹	
2: (𒂍)𒀀Y	2047 𒀀𒁹		2015	𒀀𒁹𒁹𒁺
	1327 𒀀𒁹"𒁲		1251	𒂍𒀀𒁹𒁹𒁺
3 Z 𒀸Y	3143 𒄑𒀸𒁹𒁹		1531	𒂍𒀸𒁹𒁹
	3164 𒂍𒄑𒀸𒁹𒁹		1057	𒍣𒀸𒁹"𒁺 2375 𒅆𒀸𒁹

The great majority of the Indus inscriptions are seals. The preserved sealings, the archaeological context (found with weights, etc.), and the analogy of those contemporary Near Eastern civilizations which traded with the Indus people as well as classical India indicate that the Indus seals were used in administration and trade. The texts of the Sumerian and later Indian seals chiefly consist in: 1) Proper names, with or without patronymics and occupational titles, 2) Titles of officials, or names of institutions (temples, monasteries), 3) Votive dedications to deities or (in Sumer) to priestly rulers. On the basis of this comparison, the most frequent type (no. 1) of the Indus inscriptions would seem to comprise proper names. The practice of putting the proper names in the genitive case, as indicating that the seals and the goods stamped with them "belong" to the owner of the seal, is parallelled by the early historical seals in India, most of which end in the Prakrit genitive suffix *-sa*. The type with a different ending (no. 2) would then be dedications. The signs belonging to the group marked with Y would denote the gods to whom something is dedicated, for this group also makes an important element of the hypothetical proper names. In Sumer as well as in India and elsewhere, theophoric elements often figure in proper names; e.g. Sumerian *^{d}Utu-ur-sag* "god Utu is a hero", Sanskrit *Kālī-dāsa* "the slave of the goddess *Kālī*"; the element X in the Indus names would correspond to the words "hero" and "slave" in these examples. The independent words marked with Z that follow the god's name and the genitive suffix in the inscription type no. 3 would on the analogy of the Sumerian and Indian seals denote priestly titles or temples.

9 The foregoing ξξ 5-8 indicate some of the most important means of determining the intended

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

meaning of the signs from the context. The grammatical analysis (§ 2) also provides some typological features which point to an agglutinative language, and more specificly to the only agglutinative language family known to have existed in India before 1000 B.C., namely, the Dravidian. Such features are the apparent presence of only suffixes as a means of inflection, the use of the same grammatical endings for most words, the alternation of the plain root with the root and a suffix to express the possessive case before another noun, and the word order in which the qualifier precedes the qualified word.

There are two well-known facts that have long been considered by eminent scholars to favour an identification of the Harappan language as Dravidian. One is the presence of the Dravidian language of Brahui in the immediate vicinity of the Indus valley, as a relic surviving in the mountain lands of Baluchistan and Afghanistan which are of difficult access. The other is the considerable substratum influence (manifesting itself both in loan words and in phonological and syntactic changes) exerted by Dravidian upon the language of the earliest Indo-Aryan literary document, the *Rigveda*, composed in the upper Indus vally at the end of the 2nd millennium B.C.

However, many authorities have maintained, it is *a priori* also possible that the Harappan language belonged to an unknown language family which has disappeared without leaving any recognizable traces in the historical records, and that (ignoring the above suggested grammatical analysis of the Indus inscriptions) it could have belonged to some other known language group as well, particularly Burusaski, Austro-Asiatic, Altaic, Indo-European, or some Near Eastern language group.

Yet the long survival of such extremely archaic languages as the Nuristani and Nahali, and the relative proximity of extensive written records seem to exclude the first mentioned possibility, especially when one takes into regard both the long predominance of the Indus Civilization and its Early Indus predecessors in the Indus Valley (they must have assimilated all previous linguistic strata) and the great number of people involved. I have endeavoured to settle the matter by attempting a systematic correlation of the archaeological and linguistic reconstructions of protohistoric India (1973 and 1973a). I have suggested the identification in the following chart:

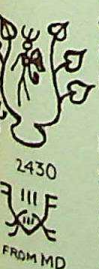
Archaeological evidence	Linguistic evidence
Mesolithic culture	survivals in Nahali, Vedda etc,.
Pamir mesolithic and Kashmir neolithic (related with Siberian Mongolian, and north Chinese mesolithic)	Burušaski (without known relatives)
Eastern neolithic	Austro-Asiatic
Early pre-Harappan in Afghanistan, Baluchistan and Indus valley (probably derived from the earlier Turkmenian neolithic)	Proto-Dravidian (probably distantly related with Ural-Altaic languages)
Copper Hoards/Ochre Coloured Pottery (derived from Early Indus culture of Rajasthan)	Proto-Central Dravidian
Indus Civilization (from Gomal in Baluchistan to Ropar etc.	Proto-North-Dravidian (surviving in Brahui and Kurukh/Malto)
Southern or Deccan neolithic	Proto-South Dravidian
Post-Harappan Chalcolithic cultures (Black-and red-ware: Banas, Cemetery H of Harappa, etc.)	Pre-Rigvedic Aryans (Kafirs, Magadhans; the *dāsas* and *vratyas* of the Vedic texts, whose traditions are represented by RS I & 10, AS, Upanishads, Epics, etc.)
Painted Grey Ware Culture	"Classical Vedic" Aryans (Brāhmana and Sūtra period)
Megalithic culture of south India	Earliest Aryans in south India
Northern Black Polished Ware	Pāli

10 Additional proof for the Dravidian identity of the Harappan language are some toponyms, especially the Sumerian name of the Indus Valley and Baluchistan, *Me-luh-ha*, to be read in the early documents with the alternative value as *Me-l'ah-ha* which corresponds to Pālī *milakkha* and Sanskrit *mlecchca* "barbarian". Its etymology is probably *Mil-akam: mil/u or vil/u "to

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

descend (mountain), settle" (Burrow and Emeneau. *A Dravidian Etymological Dictionary* [DED] 4457) whence Sanskrit Meru "cosmic mountanin"!) and *akam* [with spirantic *-k-*] "inside, house, abode," country (DED 8), cf. probably related to Old Tamil toponym *Tamil-akam* "Tamil country". In my view the great number of towns called *kot* "fort" in the Indus Valley is also of particular importance: cf. *kottai* "fort, citadel" (DED 1831) and *kuṭi, koṭa* "house, abode, family, village, towns" DED 1379), and the fact that many Indus settlements were fortified cities. The peculiar feature of the citadel being always on the western side of the lower town in the Indus cities is very striking in the light of the Dravidian homophones *koṭai* "west wind, west" (DED 1827) and *kuṭa (kku)* "west (DED 1374): in Dravidian there is a linguistic association of the "citadel" with "west". It is of great interest to not that the South Dravidian Coorgs living on the west coast are called *kuṭaku, koṭaku* (their country is *kuṭakam, Tamil Lexicon* s.v.) (DED 1374). This name appears to be derived not from the meaning "west" as is generally thought, but rather from *kuṭi, koṭa* "house, family, tribe", and to go back to Proto-Dravidian times: the same name is shared by the North-Dravidian *kurukh* (Pfeiffer 1972 p. 2f.) who live in Eastern India.

11 Henry Hears identified the sign 𒁹 (ξ 6) with the Old Tamil genitive suffix *-atu,* but could not prove his reading. A very important contribution to the interpretation of this sign has been made by Soviet scholars (*Proto-Indica: 1968).* They have given the most convincing explanation to the pictorial appearance of the sign by comparing it with the representation of the pipal tree in the Harappan iconography, especially that of the seal 2430:



My faith in the correctness of this solution has been increased by graphic variants unknown to Soviet scholars: 𒁹 on an unpublished potsherd from Kalibangan, and on unpublished copper tablets from Mohenjo-daro (the extensions may represent the grasping roots of the epiphytic plant). On this basis Soviet scholars have suggested the reading *atti* "holy fig tree, *Ficus glomerata, Ficus religiosa*" (DED 123), and by phonetic extension, the Dravidian oblique case suffix - *(a) ttu,* which often is used as possessive case marker. I. Mahadevan offered important criticism by pointing out that personal names in Dravidian seals and coins, in contrast to the Indo-Aryan tradition of north India (which indeed may owe its origin to the Indo-Greeks), never end in the genitive suffix but are always in the nominative. Yet according to the above analysis (ξξ 7-8), the proper names of the Indus inscriptions end in the sign 𒁹. I see a possible solution to this dilemma in the early Old Tamil onomastics, in which the name *Ātan,* normally as the last name is very common (Subrahmanian 1966-79, and *Tolkāppiyam* Eḻutt. 348-350). Atan seems to be a derivative from the root ā (on aku) 'to come into existence, be, become' (DED 282): from the past participle *attu* (?) and the masc. sg. 3rd marker *-an.* It occurs to me that ātan may at one time have functioned as a proper name marker in the same way as *āka* or *ākiya* 'which has become . . .' is suffixed to adjectives in Tamil. Note also that in Old Tamil the genitive suffix *-ātu* has an alternative from *-atu* and that-ā figures as a possessive suffix in Old Kannada, Gondi and Brahui; besides *-a* in a number of other Dravidian languages (cf. Zvelebil, 1972: 275), is expressed by this sign . This A derivative of the root ā- or *ā-ku* "to be (come), come into being", with the transitive *ā-kku* "to create" (cf. also Tamil *ākkiyon* "God as the creator") (DED 282): these concepts could be symbolized by the pipal tree which is the tree of the creator god Brahma (whose prototype probably was represented in the Harappan pantheon by the planet Jupiter the pictogram 𒀭 in the above cited seal 2430 showing the deity inside the pipal tree; cf. ξξ 18 and 26). The pipal tree is also the abode of the spirits of the dead, and the place where the moon god dwells at the night of the new moon (before his rebirth): i.e., the tree of "coming into being".

12 The earliest historical documents of the Dravidian language, the Tamil-Brahmi inscriptions, are largely votive dedications. A stable element in the dedicatory formulae of these inscriptions is the past relative participle (or a personal noun derived from it) of the verb *koṭu* "to give to superiors" (DED 1708 and Tol. Col. 30; 447), used either as a simplex or (more often) in the causative. The sign 𒁹 used as the dedicatory "suffix" in the Indus inscriptions (ξ 6-8), would seem to depict the "point" or "tip" of an arrow, rather than "arrow", for the triangle is in some graphic variants unproportionately large, and the feathers are never shown, as they are in the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Sumerian, Egyptian and archaic Chinese pictograms for "arrow". It may have been used, in lack of a better symbol, as a rebus for the word *koti* "tip, pointed end, peak, summit" (DED 1704) though this word seems not be used specifically for the point of an arrow. This rebus would give us an exact homophone for the past relative participle *koṭi* "which has been given" (attested in the Kilavalavu Tamil-Brahmi inscription for the normal *koṭiya*). The combination occurring three times can be interpreted (cf *ξ* 13) as *koṭi-ōr* a form actually occurring also in the Tamil-Brahmi inscriptions (Mankulam 6).

13 The apparently grammatical diacritic signs ,and (*ξ* 6) resemble the short strokes used as numerals in the Indus script (cf. the paradigmatic alternation of the latter in otherwise identical contexts, especially etc.). The Dravidian numerals *oru*/or 'one' (DED 834a) and *iru/ir* "two" (DED 401) provide excellent rebuses for the suffixes *-or* and *-ir;* the sign perhaps depicts the concept of "(the state of being) half, incomplete, not full, a moiety" = *arai* (DED 192) used as a rebus for the suffix *-ar*. These three suffixes seem to be the most common Dravidian plural markers, which is normally expressed of masculine human beings only. The plural is very often an honorific in Dravidian, denoting singular, but it would be very useful to have these suffixes marked in a pictographic script since they label the word as a personal noun. This interpretation is appropriate for these signs since they are attached to pictograms, probably standing for attributes (*ξξ* 6,7, 14), and because they may be followed by the oblique/genitive suffix (*ξ* 6).

14 The two most common signs in the beginning of the inscriptions where one would expect to have the attribute in Dravidian, are and , as a rule followed by the diacritic signs (*ξ* 13). The sign is identical with the later Indian symbol for the royal power, the solar wheel, which belongs to the universal ruler (Sanskrit *chakravartin*, the "wielder of the wheel"), the discus weapon of Vishṇu who is prototypal emperor. The term used in Old Tamil literature of Vishṇu's (Tirumal's) discus is *āli* "roundness, circle, wheel, discus weapon" (DED 340): the god is therefore called *āliyan*. In the Indus script it seems to have functioned as a rebus for the closely homophonous root *al* and "to rule" from which we have such derivatives as *āḷi āḷan* "one who rules, king" and *āḷvār* "the Deity, as supreme ruler" (DED 341).

Another emblem traditionally ascribed to Vishṇu is a conch with right-winding spirals, called widely *valam-piri* or *valam-puri* in Dravidian (DED 4319). The first component of this word is *val (am)* "right (hand), strong", with such derivates as *val-(1) avan* "strong or powerful man" (DED 4137). The second component is *piri/puri* "twist, curl, spiral, conch" (DED 3436) . The graphic variants show that the sign undoubtedly depicts a conch; and actual conches have been also found in numbers in the Indus cities. It seems difficult to find any other word in Dravidian that could equally well serve as a rebus for the perhaps most important royal attribute *pēr/peru/pir-* "great" with such derivatives as *periyār, periyōr, pirār* "the great, saints, lords, kings,gods" (DED 3613). This interpretation is confirmed by the ligatures (where depicts "hair" =Dravidian *vāl*, cf. *ξ* 17 on the sign) and (where = =kai "hand", cf. *ξ* 29 and *valan-kai* "right hand"), which seem to indicate that in these cases the compound *valam-piri* or its first component is meant.

The most frequent "word" immediately preceding the "dedicatory ending" (*ξξ* 6-8, 12) is the combination (read from right to left). It occurs both alone (often makes an entire inscription), and preceded by the fish-signs, for which see *ξ* 17-18. These contexts suggest that the word probably means "God (*par excellence)*" and "god" (as a word appended to the proper name of a divinity). A Dravidian word matching these requirements is the widely attested *kataṿuḷ* "god" (DED 929), cf. Tamil *Kanta-k-kataṿuḷ* "god Skanda" and the *Tamil Lexicon* translation of the term: "God (who transcends speech and mind)". This translation suggests a highly philosophical and monotheistic concept of the God, and segmenting the word into two elements (cf. the Indus lexeme). The first is clearly the root *kaṭa* "to pass through, traverse, cross, exceed, excel, win, overcome, transgress" (DED 929). The second is either *uḷ* "to be, exist, have; that which is, truth, reality, existence, soul" (DID 599) or (the probably, related word) *uḷ* "inside, interior, that which is in the mind, soul; a locative ending" (DED 600). The sign = could well depict the traditional Indian churn, consisting of a dasher (a forked stick) turned in a pot by means of a rope, as in the myth

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of the churning of the milk ocean, associated with the second incarnation of Vishṇu. There is, in Dravidian, a close homophone of the root *kata* fitting this interpretation: *kaṭai* "to churn" (DED 957)). The sign is identical with the mark drawn on their foreheads by the Vaishnavas from at least medieval times. Also the meaning of "pervading" and "traversing" implied by the root *kaṭa* points to Vishnu, whose chief feat in the *Rigveda* (where he is an intruder in the pantheon) is the traversing (*vi-kram-*) of the cosmos with three steps. The sign is at times drawn slanting , which seems to indicate that it has been turned 90° to save space (cf. the sign = and the ligature = = ; for the meaning of this ligature cf. as *atti* "pipal: the tree of souls" and *uḷ* "soul", and as the oblique suffix *-(a)ttu* and *ul* as locative suffix). It might well represent the three worlds, one above the other which Vishṇu crossed, and to stand for the world *uḷ* "existence". Also the sign is a forehead mark, this time of the Śivaites (cf. Śiva as *tribhuvaneśvara* "the lord of the three worlds"), so that the word for "God" (*par excellence)* would comprise, in the Indus script, the symbols of the two greatest gods of Hinduism (cf. the Hari-Hara concept).

16 The above interpretation of the sign is also confirmed by the sign , which is found, often making alone the second line, in eleven inscriptions out of the toal of seventy (about 15 per cent) found in the Harappan city of Chanhu-daro situated near the ancient city of Potala or Patala at the place where the delta of the Indus river begins. It is not attested in any of the thousands of inscriptions found elsewhere, and apparently denotes the Harappan name of the city. The legend of a near-by village associates Chanhu-daro with a big and long-snake; water snakes are characteristic of the delta region *(Periplus 38)*. As I have put forward in greater detail in a paper presented at the 29th Congress of Orientalists (Paris 1973), this snake of the legend is probably a relic of an ancient *genius loci*, considered as the actual ruler of the city: the divine serpent Śeshaof the Hindu mythology, Vishṇu's couch in the cosmic ocean, and the mythical ruler of the netherworld. The netherworld, which seems to be meant by the pictogram since only its rightmost (i.e., lowest) stroke slants, is in Sanskrit usually called *Pātāla*. The word seems to be a compound, since also *Tāla* alone is used of a particular hell (*-tala* in the names of the stories of the netherworld seems to be secondary, due to Sanskrit *talam* "surface, level"). It is of great interest to note that Śesha has a golden palmyra palm as his emblem: the Sanskrit word *tala* "palmyra palm" is in all likelihood derived from Dravidian *tāl* "palmyra palm" (DED 2599). The latter has a homophone which provides a good etymology for *(Pō/Pā-) Tāla* as the name of the netherworld as well as Chanhu-daro as the city of the "low-land", the delta area which moreover is characterized by palmyra palms not growing elsewhere in Sind: *tāḻ* "to fall low, be low, descend, decline, sink in water; lowness, humility, inferiority, depth; under(neath), below" (DED 2597). The first component may be either *pō-* "to go, proceed, reach a destination, go away, cease, die" (DED 3734), as referring both to the place where the dead go, and where the Indus river reaches its destination (cf. also the homophone *poṉ* "gold" [DED 3732]: Śesha's palmyra is golden); or *pā- (paku-)* "to be split, divided" (the city of Potala or Patala was according to Arrian situated at the place where the river Indus was split into two main channels). The form pātāla may also be due to later Aryan associations (cf. the etymologies in Mayrhofer s.v.)

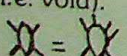
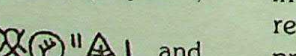
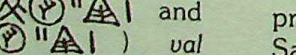
17 A central place in the decipherment of the Indus script is occupied by the numerous fish-signs, which comprise, with the signs forming stable combinations with them, roughly 20 per cent of the entire material. It is these fish-signs that most often occur in the position of probable deities (group Y in § 7-8). The pictorial interpretation of the basic shape as "fish" is absolutely certain, for an identically drawn fish is seen in the mouth of the fish-eating *gharial* represented in Indus iconography. At the outset it is clear that the elaborately carved seals do not record the fish caught, even though numbers do occur in connection with the fish signs. Henry Heras read the sign as *mīṉ* "fish" (DED 3999) and assigned to it, among other meanings, also that the homophone *mīṉ* "star" (DED 3994). Heras' observation that the lexeme = corresponds to the Old Tamil name of the asterism of the Pleiades, *aṟu-mīṉ* "six-star" (the asterism consists of six visible stars), is also of great importance. To this may be added the Old Tamil name of the mriga–śīrsha asterism, *mu-m-min* "three-star" (noted by Soviet scholars) and 3009 = Old Tamil *eḻu-mīṉ* "seven-star",

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the name of Ursa major. Further important evidence pointing to this direction is the observation made by Soviet scholars that the combination (in 3232 and 2875 clearly a god's name according to our definitions) gives the typically Dravidian formation *miṉ-miṉ* which is also attested, meaning "shining" rather than "firefly" in the Indus texts (DED +S 3994).

18 A decisive test for this theory is provided by the numerous ligatures of the basic fish sign, which, in contrast to the plain fish, are never preceded by numbers in stable combinations. It is important to note that the following interpretation, slightly revised from what we proposed a few years ago, is *systematic*, for in each case the addition to the basic fish sign appears to stand as a rebus for a particular *colour*, and these very colour names, moreover, actually figure in the Old Tamil and Telugu names for the *planets*. These same words and colours are also intimately associated with some chief Hindu gods, who hold a prominent place in the Epic (pre-Rigvedic) pantsheon, and whom the planets in my opinion have represented in the Indus religion. I regret that I cannot here go into further details regarding these planet/god correspondences.

po- (poṅku-, pokku-) "to make a hole, perforate; hole, orifice, hollow, empty, void" (DED 3646): *poṉ* 'gold' (DED 3732), *poṉ* and *pōr-kōḷ* "the golden planet, Jupiter" (TL), representing the god Brahmā (Sanskrit Brihaspati, also "planet Jupiter") associated with gold (Vedic ritual), centre (architecture, cosmology) and the finest element (*ākaśa* "empty space", i.e. void).

 (cf. 2297  and 2477 ) *val* "Hair of head", "tail" (DED 4394; the latter meaning may be due to Sanskrit *vāla/vāra* "hair of tail, horse-hair", which has an IE etymology, cf. Lith. *vãlas* "hair of horsetail"): *vāl* "white, pure" (DED 4395), *vāl-miṉ* and *vāṉ-miṉ* (TL [lexicographers, who give as the meaning "comet", i.e. tail-star]), *vālu-chukka* "[the white star,] planet Venus" (Telugu in DEDS 4395), *valiyōn* "Balarāma, as white in colour" (Old Tamil). Balarâma was according to the (aetiological) myth born of a *white hair* that Vishṇu plucked from Śesha's body (Balarāma is hypostasis of the long white snake Śesha). Cf. the ligature in § 14, and the lexeme in § 28.

pay-, pac(c)- "to divide, share, apportion [in Tulu *pasalu* "fisherman's share"]" (DED 3247): *pay-, pach(ch)-* "(to be) green, greenish-yellow, paleness of complexion from love-sickness, fresh (green grass), youth" (DED 3161), *pachchai* "greenness, planet Mercury, Tirumāl(= Kṛshna-Vishṇu) as green in colour" (TL, Paripaṭal 3. 82), *pay-, pach-* "boy, child" (DED 3248: from "green, tender"). Kṛshṇa is a green-hued child-god, a love-god associated with green pasturages, the pale full-moon dancing a circle-dance with the damsels of the asterisms, the dark rain cloud (Tamil *Māyōn, Tiru-māl*) imagined as an elephant (a symbol of fertility, Pillaiyār "boy, Ganeśa", the "wise" and "plump" god, cf. the characteristics of Budha "wise, planet Mercury").

vēy=mēy "to thatch, thatched roof, to cover" (DED 4552): *may, mach-* "black, blackness, soot, dirt" (DED 4187), *ma, may-, mach-* "black, dark, cloud, night" (DED 3918), *mai-m-miṉ* "the black star, planet Saturn" (Puram 117,1), associated with the god of death (Paṉpāṭal 11,8) who is black (Sanskrit *Kāla* "time", "god of Death" is derived from *kāla* "black" [DED 1253] and *kaḷi* "to pass (as time, season), expire, die, come to an end" [DED 1142] from which also *Kali-yuga*, the name of the worst world age, is in my view derived; cf. also *kalu* "griffin vulture" [DED 1147], the bird of death and Saturn's vehicle). The god of death rides a black buffalo: cf. *mai-y-ān* "buffalo, as black" (Kuṟunt. 279, 1) and *may* "barren buffalo or woman" (DED 4188).

The fifth visible planet, the "red star" *(chem-miṉ* in *Puṟam* 60.2), planet Mars, is in all likelihood represented by the lexeme the exact interpretation of which is still open to dispute. In Sanskrit it is called among other names *rudhira* "blood", and it apparently represents the god *Rudra* "red" (associated with *rud-* "to cry" after the model of Dravidian *aḻal* "fire, anger, inflammation in cattle [cf. Rudra as paśupati], Agni, planet Mars" (DED 234, TL): *aḻu* "to cry (as peacock!)" (DED 240) and therefore not Rudhra). Rudra is *nīlakaṇṭha*, i.e. has a dark-blue neck as the peacock, the animal of Skanda = Tamil Murukaṉ = *Cheyyōn, Chev-vēḷ*, the "red" god of war (shedding blood).

19 The verification and development of these theories has directed my research towards the study of the origins of the Indian astronomy and the reconstruction of the Harappan religion. Some of the chief results were communicated in a

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

paper presented at the 29th International Congress of Orientalists (1973). Space forbids me to make but a very brief reference to some points of immediate importance for the decipherment.

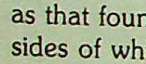
The occurrence of planets' names, often in strings, in Harappan proper names, seems to be related to the later Indian practice of recording the position of the planets at the moment of birth in the all-important natal horoscope. It is true that this practice, as is planetary worship in general, is recorded only at a comparatively late date, in early post-Vedic times. It is, however, not necessary to conclude that it was adopted only along with Greek astrology that exerted a deep influence at that time. Planets *(devıchara grâhah)* seem to be mentioned, together with the sun, moon, Rāhu and Mṛtyu Dhūmaketu, already in the *Atharva Veda* (19, 9, 7, 10). The worship of the nine planets as minor divinities has since post-Vedic times been very popular in Hinduism. The *Jaiminīya Gṛhyasūtra* (2, 9), however, expressly identifies the planets with the chief Hindu gods (agreeing with the correlations proposed above, if Balarāma is substituted for Indra: both are great drinkers and plough-gods). Important ethnographic parallels are supplied by the Meso-American civilizations, not to speak of the Mesopotamian (already the Sumerians use the pictogram of star as the determinative of gods' names: DINGIR and Graeco-Roman traditions, from which Indian astrology has been thought to be largely derived.

20 The scarcity of references to planets and asterisms in the *Rigveda* contrasts remarkably with the *Mahābhārata* and the *Atharvaveda* which represent pre-Rigvedic Indian traditions. The absence of the naksatra calender from the Avesta, and its appearance fully developed in the *Atharvaveda* prove its Indian origin, as far as the Aryan tradition is concerned. It is the subject of an old controversy whether the Indian star calender was borrowed from the Chinese or *vice versa* (the theory of an ultimately Mesopotamian origin is untenable, for the system there is heliacal, and not based on the opposition of the sun and the full moon as is the case for these two). There is general agreement that the astronomical evidence points to about 2400 B.C. as the date when the calender was compiled. At this time there was no urbanized civilization in China, while in India the Indus civilization (neglected in these discussions) had reached its peak. As comparative studies in early urban civilizations show, the creation of a solar calendar was at least equally important as a requisite of urbanization as was the development of a phonetic writing system. Tangible evidence for Harappan practice of astronomy is supplied by the careful orientation of the cities, which must have been accomplished with the aid of a gnomon. The directions of space, the seasons, the sun and nakṣatra calendar play an immensely important role in the Vedic and other later Indian ritual, which, as I have argued in greater detail in the above mentioned paper, to a large extent was derived from the religion of the Indus civilization. Evidence for a Dravidian origin of the nakṣatra calender is the hitherto unexplained word *b(h)ekurā=°ri* of the Vedic texts, in which Weber (Abh.Akad.Berlin 1861, p. 274 f.) rightly saw a name for the *nakṣatra* asterisms: cf. Tamil *vaikuṟu-mīṉ* "morning star" and the Dravidian roots *vaiku* (North Dravidan *beku!*) "to stay the night, to pass the night, to protract till dawn, dawn" (DED 4570) and *uṟu=uṟai* "to be near, to be joined, come in contact with, to dwell, abide, have sexual intercourse with" (DED 608). The asterisms with which the moon as divine seed layer joins every night are thought to be his concubines (cf. Weber i.c.): in India it is sometimes customary to consider the conception as "birth" (cf. also § 30). Already in the Vedic period it was a common practice to give the child a name according to the asterism of birth, but since it had to be kept secret, there is more abundant evidence of such names only from the times of the Buddha.

21 A very important confirmation to the above interpretation concerning the planets is given by the Indus sign most often occurring immediately before the various fish-signs, but sometimes also after them. The meaning "planet" would excellently suit these contexts. The allographs and (cf. =) prove that this sign depicts a crab, but since the feet have been left off in the majority of the cases, the emphasis is clearly on the claws. Since the crabs are best known for their tight grip (Pali *sugahanam*, from the root *gṛh-*) in Indian folklore (*Jātaka* no. 38 & 267), this is an appropriate symbol for the concept of "seizure", (DED 1788). The word *graha* appears to be a calque on the Dravidian expression, which alone has a reasonable etymology for the meaning "planet" in the homophone *koḷḷi* "firebrand, glowing ember" (DED 1794): the idea of the planets

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

(especially the ominous Mars and Saturn) being malignant demons who "seize" human beings with invisible slings of sickness, is undoubtedly secondary and at least partially due to the homophone *koḷ* "to seize".

This interpretation receives additional force from the above cited ligature where the sign appears to function as a phonetic indicator. This ligature occurs alone on the reverse side of several copper tablets found in Mohenjodaro. The inscription on the obverse is the same as that found in several other tablets the reverse sides of which always show a goat-faced hunter god armed with a bow, obviously the same as the goat-faced male figure represented in the Indus terracottas and dance-masks. Since there is a clear interdependence between the inscription and the iconographic motif also in the case of the other copper tablets, the ligature apparently stands for the name of the hunter god. The other component of the ligature is clearly the Indus sign  , showing three branches bearing fruit, the central branch being omitted in the ligature in order to make space for the phonetic indicator. The pictogram resembles the pipal motif on the pre-Harappan pottery of Mundigak: and indeed the graphic variant of the ligature in an unpublished seal from Harappa (13751) has the leaves of a fig: . The word meant is in all likelihood, *koḷi* "fig, banyan, tree bearing fruit without outwardly blossoming (as some figs do), epidendron, grasping fig" (DED 1867). This "grasping fig" seems to stand for the Harappan name of Rudra, the cruel god who according to the *Rigveda* with his characteristic weapon, the bow, shoots arrows of fever and sickness on cattle and people. The Āśvalāyana Grhyasūtra uses for Rudra the lateron so popular name *Hara* which also literally means "seizing". The root *koḷ* "to seize" (cf. *koḷ* grasping) also has the homophone *koḷ/koḷ* "to hit, wound, kill, shoot with bow" (DED 1789). Rudra is the fire-god, identified with Vedic Agni (cf. also *koḷḷi* "fire-brand, fire"), whose animal form is the red-haired goat. Another close homophone, *koḻu-* "young, tender, son" (DED 1787), is used in Tamil as the name of the ever-young war-god Skanda, the "son" (= aspect) of Rudra-Śiva, who in the Indian medicine figures as a sickness demon (*graha*) sucking infants' blood (cf. *rudhira* "blood" as the name of the red planet Mars, the "fire" star). A goat-faced hero called Viśākhā is said to have been born of Skanda's side: Viśākhā is one of the asterisms, the one opposite to the Kṛttikā (Pleiades presided over by Agni) in which Skanda (Kārttikeya) was born. The *Śatapatha-Brāhmaṇa* (4,6,5,1 ff.) connects the sickness demon *graha* with the rising and setting sun, and indeed the red and beautiful, young Skanda is often compared with the red rising sun. The sun is "born" in the Pleiades marking the new year in the original form of the naksatra calendar in the earliest lists.

23 The principle of economy of the early writing systems suggests that the sign normally had a different phonetic value. This is probably *vaṭa* "banyan tree, *Ficus Indica*". This tree is native to India and does not grow in the regions where the Aryans came from. Though the word is considered to be Sanskrit (not in DED), I have no doubt of its Dravidian etymology, which I see in the exact homophone *vata* "rope, string cable, cord" (DED 4268): the hanging air-roots resembling ropes or cables are the most characteristic feature of the banyan tree. In the classical Hindu cosmology of the Purāṇas *vaṭa* "banyan" is the tree of the north, which is another clear proof for its Dravidian origin, for in Dravidian only do we have an exact homophone *vaṭa* meaning "north" (DED 4267). The star of faithfulness, pointed out to the bride in the marriage ceremony (like *dhruva* "pole star" in the Vedic *Gṛhyasūtras)*, is called *vaṭa-mīṉ* "north star" in Old Tamil: it is striking that the combination occurs twice in the Harappan inscriptions. According to the Purāṇas (VP 2, 9 and 12 etc) the planets, asterisms and other stars are held in the air by invisible cords binding them to the pole star and thus preventing them from falling: an idea which seems to refer to a banyan tree with hanging roots as the pole star, attested already in *Rigveda* 1, 24, 7!

24 The sign often precedes the fish-signs and , being apparently used as an attribute, but may also occur as an independent word, then probably meaning a divinity since signs of group Y (§ 7-8) follow. The closest parallel in later India is offered by Sanskrit *śrī* "title prefixed to names, expressing distinction or eminence" and "the Goddess of beauty, prosperity and good fortune", and Tamil *tiru* "holy" (also commonly prefixed to names of persons, gods, places, etc. like *śrī*) and "Goddess Śrī". The word *śrī* having a good IE etymology (Greek κρείων etc.),

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and the change (Indo-Aryan *s-* >) *c-* > *t-* being known in South Dravidian also from other cases (Zvelebil, *Comp. Drav. Phonology*, 1970, 90 f.), Tamil *tiru* and Kota and Toda *tir, tī* (used of the holy buffaloes of the Todas) have been considered to be derived from *śrī* and Prakrit *siri* along with the obvious loans in Tamil (*chī, chirī*) and Kota (*chiry*), cf. DBIA no. 211. There are, however, a number of certainly original Dravidian words, which suggest to me that *tiru* "holy" is genuine Dravidian: *teri, tiri* "to be seen, perceived, understood; clear, shining, bright, pure, holy" (DED 2815); *tiruntu / °ttu* "to be correct, perfect, be improved, reformed as a person; to correct, rectify mistakes, change one's frame of mind" (DED 2659); *tīr* "to be completed, finished, settled; finished, complete, entire, beautiful" (DED 2683). A fourth homophone would fit semantically very well as an epithet to the planetary deities revolving in the sky, and to the traditional Indian "holy men" who wander around (cf. their Sanskrit name *parivrājaka*) and live by begging alms: *tiri-, tiru-* "to turn, revolve (as a potter's wheel), wander about in the quest of alms, etc." (DED 2655). The pictogram = *ξ* the phonetic complement *kai* "hand" (cf. 29) seems to depict the word *tirikai* "potter's wheel" derived from this root. The sign may also stand for the word *taṇṭa* "forearm" (DED 2476) to suggest the word *tiri-taṇṭam* which in Tamil is used of the stick with which the potter makes his wheel revolve (for *tanta:* Sanskrit *daṇḍa* cf. Emeneau, IL 1 1958, 71-73).

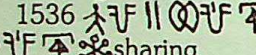
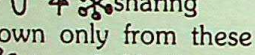
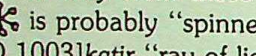
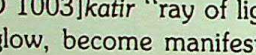
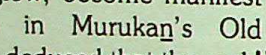
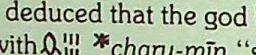
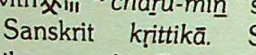
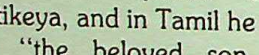
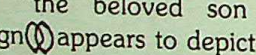
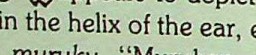
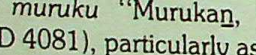
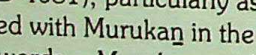
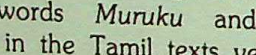
25 Turning to the signs of group Z (*ξ* 7-8), the most frequent occupation or title to be expected on analogy of the Sumerian seals, that of the scribe, is probably represented by the Indus sign : the combination is very common and may make an entire inscription. The allographs (, ,) and the Sumerian parallel APIN "plough" explain the pictorial aspect. As in Sanskrit *likh-*, so in Dravidian the root *var(a)i* means both "to plough" and "to write", the basic meaning being "to make a line with a sharp instrument" (DED 4304).

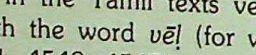
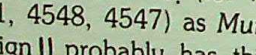
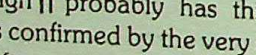
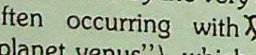
26 The sign probably stands for the word *āḷ* or *āṇ* "man", which also means "servant" (DED 342a), thus fitting the contexts. The Indus seals having the most striking religious iconography bear inscriptions of the comparatively rare type no. 3 (*ξ* 7-8) with this pictogram: 2420 ("proto-Śiva") ...and 2430 ("Pipal-god") ...Cf. also the role of *(mahā) purusha* and *Manu* "man" in the Indian religions, and the Dravidian homophone *āḷ* "to rule, control or manage (as a household)" (DED 341): the head priests were considered to be the "managers" of the god's household on the earth in archaic societies.

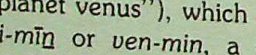
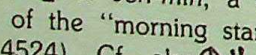
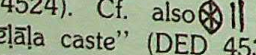
27 A sign often occurring at the end of the "priestly titles" as well as at the end of inscriptions of types no. 1 and 2 (*ξ* 7) is . From these contexts it seems likely that the intended meaning is that of "woman, wife", or a feminine suffix. The most common Dravidian word for "woman, female" is *peṇ, peṇṭu, peṇṭi*, which also means "girl, wife, daughter, female of animals or plants" (DED 3608a); cf. also *peṭṭai* "female of animals and birds, woman, girl" (ibid. b). This word has a homophone, the earliest form of which is probably *peṇṭika*,* though it must have early split into* *peṇika* and *peṭika*,* meaning "comb" (DED +S 3607). The early Indo-Aryan borrowings have preserved to us a hint to the etymology of this word: Pāli *phaṇaka* means "an instrument shaped like a snake's hood, used to smooth the hair" (PTS), and besides Prakrit *phaṇaga* and *phaṇiha* "comb" we have Sanskrit *phaṇa* "comb" in the *Sāṅkhāyana Gṛhyasūtra* 4, 15, 7 among the toilet articles presented to *snakes*. The word *phaṇa*, which normally means "cobra's hood", has in Sanskrit a variant *phaṭa*, and both are most likely of Dravidian etymology, cf. in addition to *paṭa(ka)* "cobra's hood" (DED +S 3180) also *peṭṭu* "furious, fierce, stiff" (DED 3604) and *pettu* "to hit, beat, strike" (DED 3601), the expanded hood characterizing a furious cobra about to strike. Double-sided combs resembling cobra's hood have been found in the Indus cities.

28 The combination (cf. 5) can be read as *aṇṭ-i, aṭṭ-i* "woman, wife" (DED 342b), a derivative of *āḷ/āṇ* "man" (ib.a), if we allow for the sign *peṇ* "woman" also the value of the early and widely attested feminine suffix *-i*. Then we could also interpret the lexeme as *peṇṭ-i*, a very frequent variant form of *pen*. It is striking that both of these words are to be found on one and the same seal 1227 inscribed on both sides, the edges showing, in addition, a shamaness with cloven hooves, a tail and horns: the comparable shamaness dancing with a horned tiger on the seal 1357 has quite distinctly female breasts (cf.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Marshall 1931 vol III pl. CIX: 227, 230 and CXI; 356, 357). The two inscriptions of the seal 1227 read:  and  . From the inscriptions 1536  and 2098  sharing the epithet  . known only from these two inscriptions (= is probably "spinner's spindle" = *katir* [DED 1003]*katir* "ray of light, sunbeam; to shine, glow, become manifest" [DED 1001], common in Murukaṉ's Old Tamil epithets) it can be deduced that the god  has something to do with  **chaṟu-mīṉ* "six-star", the Pleaides, Sanskrit *kṛittikā*. Skanda's metronym is Kārttikeya, and in Tamil he is called *aṟu-mīṉ kātalaṉ* "the beloved son of the Pleiades". The sign  appears to depict *muruku* "ornament worn in the helix of the ear, ear-ring" (DED 4082) = *muruku* "Murukaṉ, Skanda, young man" (DED 4081), particularly as the ear-rings are associated with Murukaṉ in the folklore. Because the words *Muruku* and *Kanta* (> *Skanda*) are in the Tamil texts very often compounded with the word *vēḷ* (for which cf. DED 4562, 4561, 4548, 4547) as *Muruku-vēḷ*, *Kanta-vēḷ*, the sign  probably has this value. This hypothesis is confirmed by the very common lexeme  (often occurring with *vāḷ-mīṉ* "the white star, planet venus"), which can now be read as *veḷḷi-mīṉ* or *ven-min*, a common Dravidian name of the "morning star, planet Venus" (DED 4524). Cf. also  *veḷḷ-āḷaṉ* "man of the Veḷāḷa caste" (DED 4533), and  , possibly *veḷḷ-āṭṭ-i* "maidservant, concubine, harlot" (DED 4532). It must also be pointed out that Murukaṉ is specially worshipped with shamanistic devil-dances, and that the word *āṭṭi* "woman" is a near homophone of *āṭi* "dancer" and *ātti* "one who makes (snakes) dance" (DED 290), which is probably meant by the Indus sign  (with cloven hooves as the shamaness in the above mentioned seals).

29 The lexeme  in the seal 1227 (§ 28) calls to mind the six heavenly women of the asterism of the Pleiades, who conceived and nursed Skanda/Murukaṉ. If the planets were worshipped by the Indus people, then certainly also the asterisms, so prominent in the early Indian astronomy, played a role in their cult. The graphic variants ( = =) and parallels in other pictographic scripts (Sumerian  , Chinese ,) suggest that the sign depicts "hand",. which in Dravidian is generally called *kai* (DED 1683). This word is homophone with *kai* "younger sister, young woman" (DED 2445 and Emeneau Lg. 29, 1953, p. 339-353). I think the latter word has originally been abstracted (as referring to the "bride") from such expressions as Tamil *kai-toṭu, kai-y-eṭu, kai-y-ottu, kai-tā, kai-taṭṭu, kai-p-piṭi* "to hold the hand in marriage, marry", cf. especially *kaiyai* "younger sister" and the accusative of *kai* in *kaiyai-p-piṭi* "to marry". This interpretation is corroborated by the ligatures  and where *peṇ* "woman" is either a semantic indicator or a phonetic complement, marking the feminine suffix *-i*, as in *kaichchi* "younger sister". The asterisms are in the Vedic texts said to be heavenly damsels (*apsaras*) with whom the Moon as the heavenly playboy (*gandharva*) dances and unites every night. Statues of naked dancing girls have been found in the Indus cities, and they point to the existance of the *devadāsī* institution. These sacred prostitutes probably formed groups according to the number of the various asterisms (cf. Skt. ganika "Courtesan" and *gaṇa* (number), group; Tamil *kaṇam*, constesan and gana (number) group, Tamil *kanam* 'constellation and star').

30 The reverse sides of the oldest, clearly votive tablets usually show the sign  , preceded or not by one to four strokes representing numbers. In some cases a picture of a fish has been added, either before or after the sign  , or on a third side, cf. 3452 , 3863 , 3591 . From the iconography in 2728 showing a worshipper with a pot in his hands kneeling in front of a holy tree (the adjoining inscription runs ) it is clear that the sign depicts a sacrificial pot. In the early version of the Indian flood myth, which can hardly have its origins but in the Indus cities living in the constant peril of catastrophic floods, Manu got a fish in his hands from the water pot while washing his hands. The fish asked for his protection, and Manu kept it first in a pitcher, then in a tank and then let it free in the ocean, to be later saved by the fish. In the temple tanks of modern India, fish are kept and protected by strict taboos, and evidence for a similar practice in the Harappan cities is a waterpipe from Kalibangan with the fish-sign upon it. Fish is a very important symbol of procreation on account of its prolificacy, and it is used in Indian marriage ceremonies. Also, fish are considered as abodes of the spirits of the ancestors, and at funerals they are put in pots, which are afterwards hung up in the house to be

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

worshipped as containing family deities. All this points to an actual fish-cult being practised by the Indus people, and explains why the word for "star" is not written with an ideogram ✳ as in other pictographic scripts, but with the homophone of "fish". The Dravidians can consider the stars to be fish swimming in the ocean of the sky: in India, pious ancestors are also thought to have become stars in the sky (the seven sages, etc.). The sage Agastya (identified with the star Canopus) is said to have been born of Mitra's and Varuna's seed that fell in a pitcher (Tamil *kutam*). This is clearly parallelled by the fall of Śiva's seed in the place of the heavenly river (the ecliptic, also called *nāgavīthī* "snake-path") where the six heavenly women conceiving Skanda were bathing. In the Veda, this heavenly river is *Sarasvatī* "(river) with ponds": the word *ap-saras* used of the heavenly damsels means literally "water-pond", and these nymphs are in the folklore said to dwell in lotus ponds. The sign U apparently denotes *kuṭam, kuṇṭam* "pot, pool, pond, pit" (DED 1389, 1376) and refers to the ponds of the heavenly river: the snake *Kuṇḍalinī,* spouse of Śiva as the heavenly Gangā, who in the microcosm of the human body passes through lotus centres in *Yoga*. The moon lays his seed in the asterisms, which are carefully noted when a human being is born; in Tamil *kuṭam* is also actually the name of the Pusya asterism, and *aḷaṟ-kuṭṭam* "fire pond" that of the Pleiades.

These examples may suffice to illustrate the convergencies reached so far while attempting to solve the crossword puzzle of the Indus script. I have no illusions about infallibility of the individual interpretations proposed, but together they do make a consistent system and, moreover, tie very well with the clues that the later Indian civilization offers for the reconstruction of its protohistoric past. Indeed, I find it exceedingly difficult to imagine what else some of the above discussed signs (the fish signs, in particular) could possibly denote, if this approach is entirely wrong. But there is no doubt that much more work is needed: the Indus script is still full of challenging problems.

Addendum (January, 1976): Since this paper was submitted for publication in June, 1974, a number of additions to it have accumulated. They consist in part of new details supporting the interpretations presented here, and in part of new interpretations interlocking with the previous ones. These additions are now in press, and are published under the title "Interpreting the Indus script, II" in *Studia Orientalia*, Vol. 45 (1976), p. 125-160. For a more general recent discussion a and bibliography, see also A. Parpola, "The problem of the Indus script", in *Essays in Indian protohistory*, ed. D.P. Agrawal and Dilip K. Chakrabarty (New Delhi, 1979).

"Illustrations taken from"

1. *Source:* Lambrick, H.T. *Sind: A General Introduction*, Hyderabad (Sind, 1964, map facing page 132
Text: The location of Patala. Cf. § 16.

2. Marshall John (ed.) *Mohenjo-daro and the Indus civilization*, London 1931; Vol. III, plate CIX: nos. 227 and 230 and CXI: no 356 (put in one row) and pl. CXI: 357
Text: The seals 1227 (excavation number L. 323) and 1357. Cf. § 28-29

3. Mackay, E.J.H. *Further Excavations at Mohenjo-daro*. Vol. II, New Delhi 1937, pl LXXIV: nos. 21-26 or only 25-26, and Archaeological Survey of India, *Annual Report* 1925-26 pl. XLVI:7.
Text: The predecessor of the god Rudra (Skanda). Cf. § 22.

4. Marshall III pl. CXVI no. 20 (lower).
Text: Gharial with fish in its mouth. Cf. the heavenly crocodile (Taittiriya Aranyaka 2, 9) and the "Jaws of Rahu" in later Indian tradition, and § 17.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

22

S.R. Rao

New Light on Indus Script and Language

The term 'Indus script' is used here to include the Harappan script (2500-1900 B.C.) and Late Harappan script (1900-1600 B.C.), **(fig. 22.1)** the latter surviving in the post-Harappan period also upto 1000 B.C. Rojdi, Diamabad and Theur are the Chalcolithic sites of Late Harappan and post-Harappan times using a simplified Harappan script which is designated Late Harappan both on chronological and technical grounds. Recently, the Ramapuram Distt. Kurnool excavation (unpublished) by Narasimhiah (personal communication) has brought to light Late Harappan signs inscribed on Chalcolithic pottery of the Iron Age (13th-8th century B.C.). Graffiti on megalithic pottery from Sanur (1000-300 B.C.) also show the continuous use of the Late Harappan script.

The Harappan script used pictures of animate and inanimate objects along with linear (called cursive by Gelb 1969: 94) signs resembling Roman characters H.P.W. A third element is the joining of different linear signs creating an illusion of pictures. When analysed, these pseudo-pictures reveal that they were compound signs **(fig. 22.2)**, formed to write, according to us, syllables and conjunct consonants **(fig. 22.2a)**. The pictures of a 'pipal leaf' and 'scorpion' had, sometimes, signs for phonetic variants attached to them. The purpose of accenting the Brahmi linear signs was to indicate the medial vowel value of consonantal signs. The Harappan and Late Harappan scribes also accented the basic signs to indicate the medial vowel. The full phonetisation of the script is indicated by the limited number of basic signs.

Simplification Of The Harappan Script

An important clue to the decipherment of the Indus script is provided by the Late Harappan script which used only 22 basic signs as against the 62 basic signs of the Harappan script. The simplification was achieved by the Late Harappans by dropping all pictures and retaining only linear signs thus effecting economy in the number of signs which is an indication of the existence of an alphabetic writing. The term 'basic sign' implies the elemental form occurring independently in inscriptions without the addition of strokes for accenting or without being encumbered in any way by joining one another. The process of identification of basic signs is shown in **(fig. 22.3.)** The number of basic signs is not as large as 417 (Mahadevan 1977: 32 ff.) since this number includes a large number of pseudo-pictures or compound signs formed by several permutations and combinations of basic signs.

The protagonists of the theory of a Dravidian language for the Indus seals, the Russians and Finish particularly, have found it convenient not to analyse the compound signs so that they can be treated as pictures and given a word-value in the language of their choice. In this method, there are three defects. First, the failure to analyse compound signs has resulted in inflating the number of basic signs from 62 (including pictures) to 417 and treating them as logographs. Secondly, objectivity is lost in assuming a language and imposing words in the assumed language on a majority of the signs which had a phonetic value. Thirdly, the complicated Harap-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

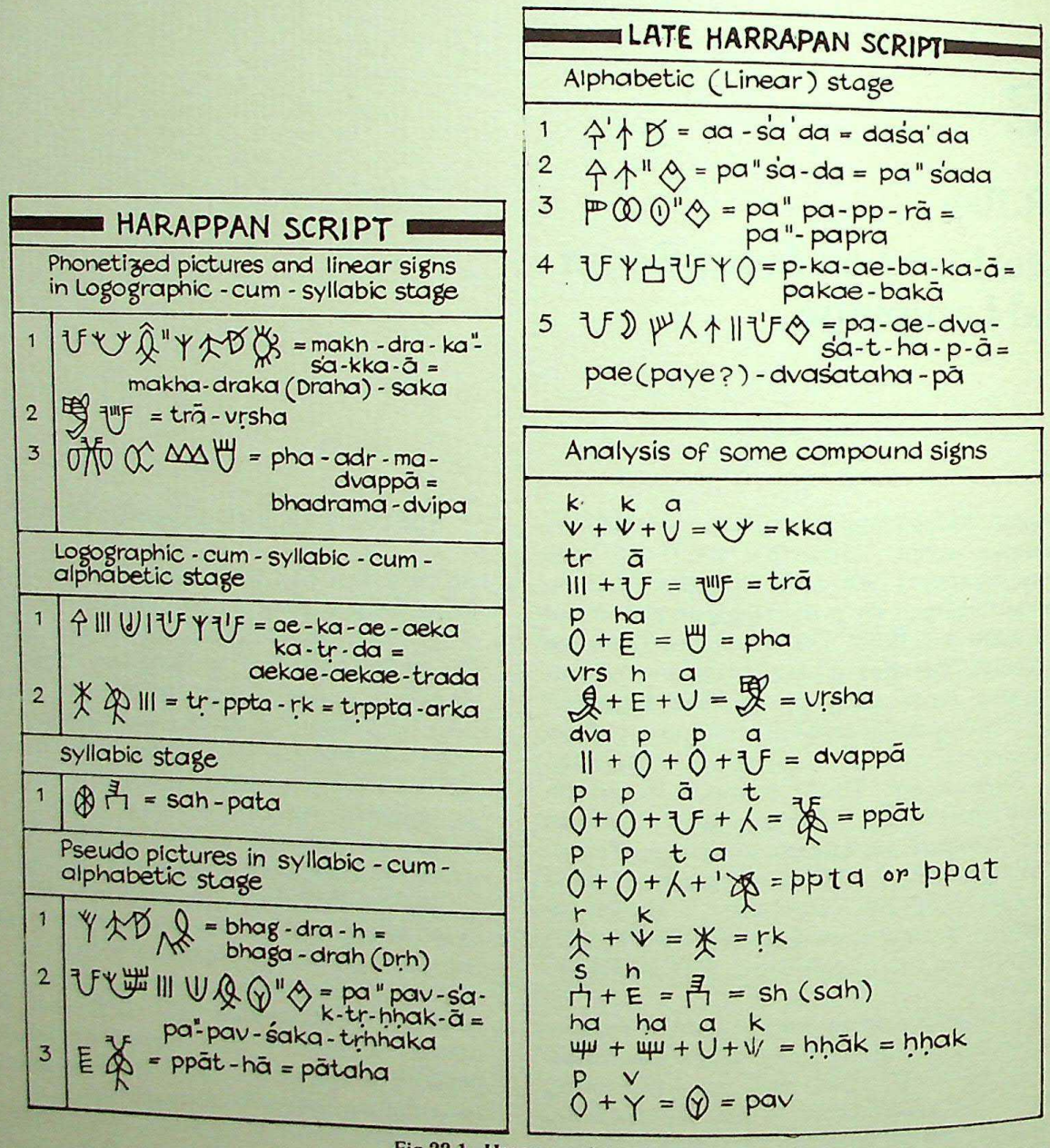


Fig.22.1. Harappan signs

pan script using pictures and linear signs is taken up first for evaluation of signs instead of beginning from the simple linear script of the Late Harappans. The Harappan script and the Late Harappan script were neither logographic, except perhaps for the use of numerals for corresponding words, nor ideographic. It was, in fact, partly syllabic and partly alphabetic in the early stage **(fig. 22.1)** and became an alphabetic script in the Late Harappan and post-Harappan phases when pictures which had syllabic values, were dropped. With as few basic signs as 62, the Harappan script could not be anything but that.

The evolution of the mixed picture-cum-linear writing of the Harappan (mature) phase into a pure linear script becomes evident from the writing on the seals from the Late levels of Lothal, Mohenjo-daro (Dales 1976), Rakhi Garhi and inscribed shards from Rangpur, Rojdi, etc.

Direction Of Writing

The writing on seal-impressions (positive) should be read from right to left as indicated by the left direction of inscribing on wet clay labels and overlapping of signs. (Lal 1961)

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

PHONETIC VALUE OF SIGNS

With a view to proceeding from the known to the unknown, the Semitic script of the 14th-11th century B.C. and its earlier form in the Sinaitic script, both written from the right to the left, and with signs common to those in the Late Harappan signs, are chosen for comparison **(fig. 22.4)**. The phonetic value of the Semitic signs is also given to the corresponding signs in the Late Harappan script. Of the 22 signs in the Late Harappan script, 17 are identical with those in the Semitic script **(fig. 22.4)**.

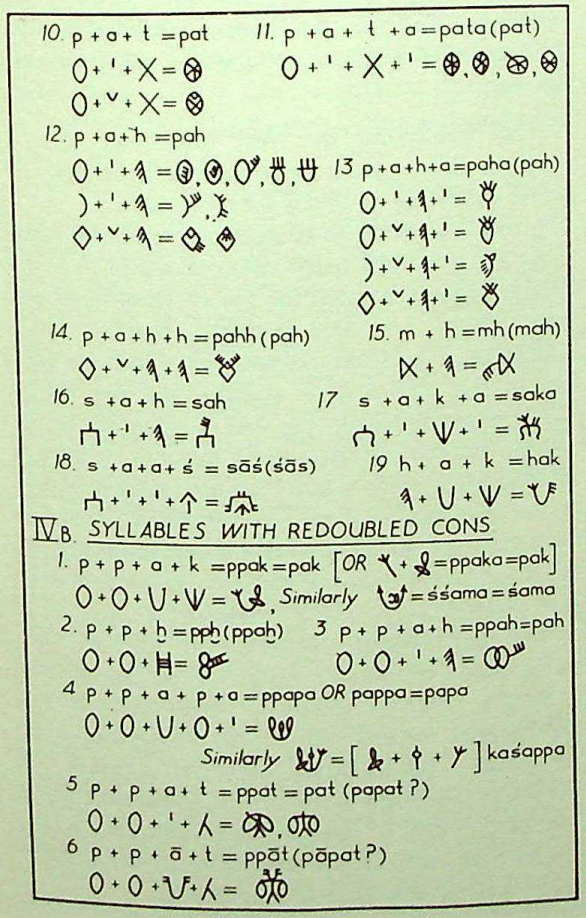


Fig.22.2. Harappan signs

While reading the Indus inscriptions containing only those signs which are identical with Semitic signs, two peculiar features of the Indus script, namely, accenting of signs and formation of compound signs were kept in mind. Whereas the Semitic script did not indicate vowel value, the Indus script did. Hence, the language of the Indus seals turns out to be a non-Semitic, and, to be precise, is closely akin to the Old Indo- Aryan

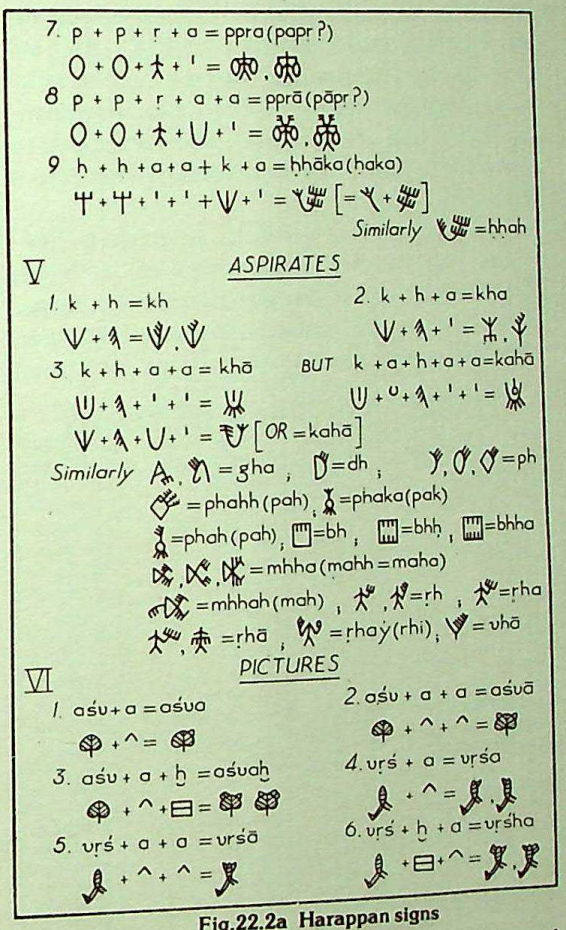


Fig.22.2a Harappan signs

language with some features of the Hittite and Avestan.

In the second stage, the 'U' sign with its accented forms is taken into account giving the phonetic value ə– as in a slightly variant sign in Semitic **(fig. 22.4, 19)**. Its accented forms are given the value *a, a, ae,* and *ao.* **(fig. 22.5)**. They act as initial vowels in most cases and are occasionally used as medials. In the first two stages of decipherment, 136 inscriptions containing signs identical with Semitic signs have been read (Rao 1979) thereby ensuring that the progress is from the known to the unknown and from the simple to the complex.

CLUE TO LANGUAGE

The words, *aeka, dasa, sata* and *happt* used for one, ten, hundred and seven respectively, in these inscriptions, indicate that the language was Indo-European. The words *pa* 'protect', *ap* 'water', *ama* 'strength', *pat* 'master, govern' *sas (sas)* 'rule' *sap* 'curse' *sada* 'eminent', *phaga* or

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

bhaga 'Lord', *maha* great and *pr* 'protect' suggest an Indo-European language, namely the old Indo-Aryan. Grammatical features, such as inflexional endings used in inscriptions for instrumental, dative and genitive cases, also correspond to those used in the old Indo-Aryan and Indo-Aryan (Rao 1980: 163).

The very fact that the Indus language is inflexional, precludes the possibility of its being Sumerian which is an agglutinative language. The presence of conjunct consonants *(samyukta aksharas)*—and use of distinct signs for voiced and voiceless stops, namely K and G, T and D, P and B are contra-indications for the Indus language belonging to the Dravidian group. Other stages of decipherment consist of evaluating the 'man' and 'fish' signs which do not appear in Semitic writing (Rao 1981: 18). They are given the phonetic value *r* (vowel) and *s* respectively from the Old Indo-Aryan words *nr* for 'man' and *sahula* for a variety of fish. A few examples of the words involving the use of these two signs are given below:

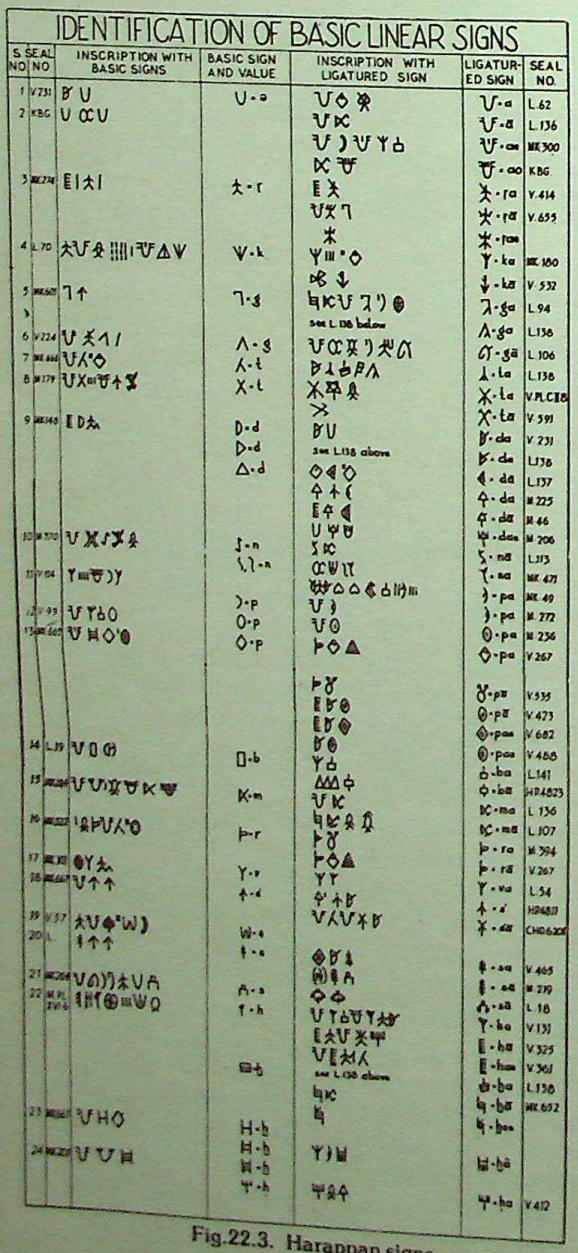


Fig.22.3. Harappan signs

pr 'protect'; *dr* 'pierce'; *drh* 'strong', hostile; *brh* 'make big'; *tr* 'save', etc.

sama 'calm' ; *sanna* 'happy' ; *sak* 'be powerful'; *sada* 'triumphant, eminent' ; *sakra* 'powerful', etc.

After evaluating the 'fish' and 'man' signs it was possible to read more than 500 inscriptions, some examples of which are given here.

In the fourth stage of decipherment, the numerals are given the word value on the basis of the words already known for the cardinal numbers: one, seven, ten and hundred; namely, *aeka, happt, dasa* and *sata* respectively which are written in the alphabetical system also (**fig. 22.1**). What is significant in the use of numerals represented by the corresponding number of long or short vertical lines is that they are logosyllables as in the inscription *pa-ra-tr-ka* 'supreme saviour' or 'supreme of the three'. But some numerals are used actually to denote number, as in the inscription *pa-pantaka* 'protector of the Five'.

The last stage of decipherment relates to the assignment of syllabic value on an acrophonic principle, and occasionally, word-value to the pictograms representing bird, scorpion, bee, pipal leaf, field, hand, etc. For example, in phonetic value *sak* derived from the word *sakuna* 'the bird of omen', *asv* from the word *asvattha* for 'pipal leaf', etc. Some examples of the inscriptions read on this basis are given here.

Phonology

The Indus or Harappan script had 40 linear signs for 21 sounds. They included some alternate signs for the same sound in the early stage. The linear sign 'U' with the value *ə–* was modified with the addition of strokes to represent vowels *a, a, ae,* and *ao*. The sounds represented by other linear signs are *k, g, t, th, d, n, p, b, m, r, v, s, sh, s, h, h* and *h* The 'man' sign represented the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

vowel *r̥*, and, when accented, it was used for the semi-vowel *r*. There are two signs for *s'* one of which was the 'fish' sign. There were no signs for palatals and cerebrals. The retention of all the three laryngeals in Indus language and the absence of two in Old Indo-Aryan suggests that the the former represents the earlier stage of the latter.

The Harappans used consonant clusters in all positions as in the Hittite and Avestan languages but unlike those in the Tamil and Sumerian languages. The Indus script gradually dropped not only pictures and pseudo-pictures but also syllabic signs and, ultimately, evolved an alphabetic system of writing retaining, however, medial vocatic indicators. A few compound signs representing conjunct consonants however continued to be in use.

The syntax of the Harappan language follows that of the early Indo-European, namely, the qualifying element following the substantive, but the reverse order is also noticeable in a number of instances. Nominal compounds are frequently used, but the verbal forms are very limited, primarily because there was no need for using a wide variety of them in the inscriptions on seals, which mention names of owners and their titles. Occasionally, names of consignees, commodities and professions also occur (Rao 1981: 25).

Purpose Of Seals And Contents Of Inscriptions

The sealings found in the warehouse at Lothal bearing impressions of packing material on the reverse and of the seal on the obverse, confirm that the seals were used mostly for authenticating goods in commercial transactions or certifying payment of tax, if any. But there are several seals and copper tablets from Indus cities which suggest their use as tokens on religious occasions or as prayer tablets. For example, some seals bear inscriptions like *aśvā satra* 'horse sacrifice' or 'sacrifice performed by *As'va*'; *sapa pa* 'protector from curse'; *s'atr tra* 'protector from the enemy', etc. A hierarchy of rulers is suggested by the titles or designations *pa* 'protector' and *paka* or *pah* 'guardian' who occupied the lowest rung; above them came the *s'āsa* 'ruler' and *pat/pata* 'governor' and, still above, were the *s'āsa-s'āsa* 'ruler of ruler' and *pat-/pata* 'governor of governor'. There used to be confederacies of rulers or clans each of which had a different animal deity such as

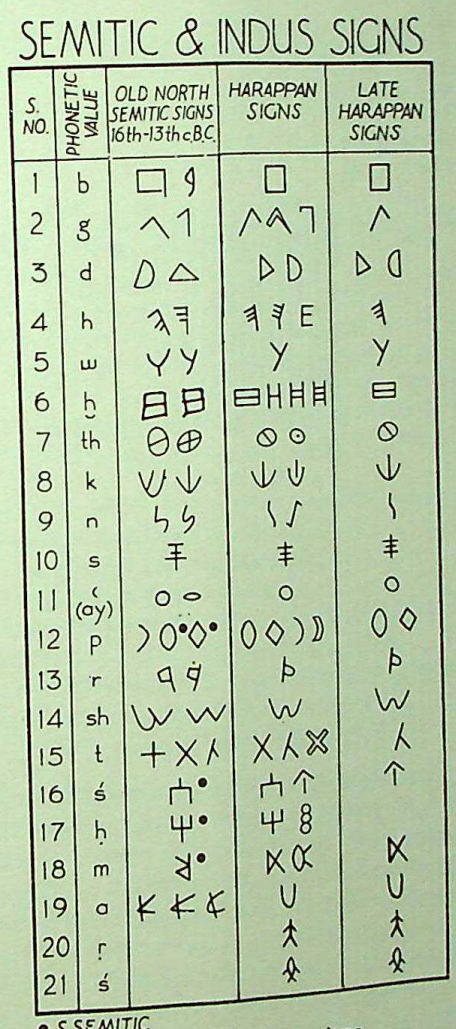


Fig.22.4. Harappan signs

the long-horned or short-horned bull, elephant, unicorn, rhinoceros, tiger, mountain goat, etc. Skirmishes amongst them are also indicated by the scene of a bull-man fighting the tiger.

Religion

The seal-inscriptions confirm that the archaeological remains reveal: such as fire-altars and other enclosures built for animal sacrifice at Mohenjodaro, Lothal and Kalibangan. Two seals depict the Fire God in the surrounds of a pipal tree *(asvattha)* and, in one of them, the inscription reads *bhag-Arka* 'Lord Arka'. In a seal depicting a flame emanating from an altar, the inscription reads *'pag bhag rkaha* '(seal) of the might Lord Arka' (Rao 1980: pl. IV. 1). Arka stands for sun, fire and a plant in the *Rigveda*. Another word used for fire is *atha* which is also the word for Agni used in the *Avesta*. The so-called Pas'upati

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

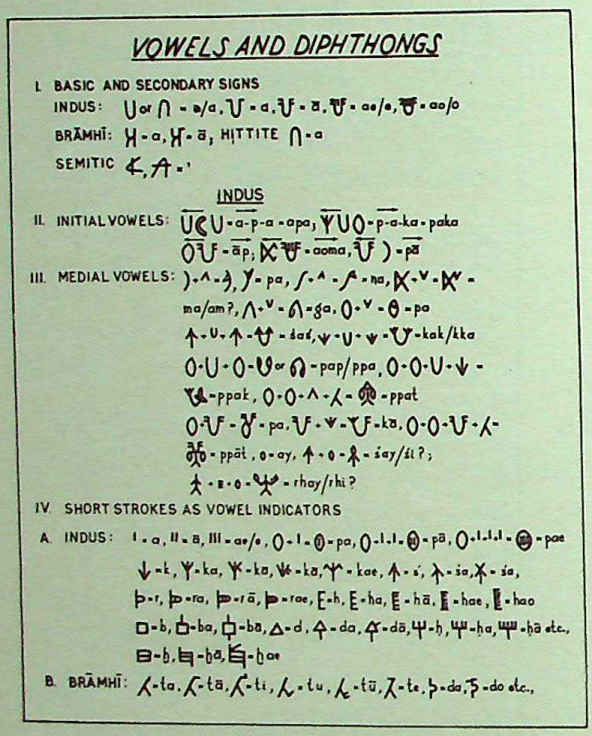


Fig.22.5. Harappan signs

seal from Mohenjo-daro (pl. II), depicts the three-faced Agni whose supremacy seems to have been acknowledged by other politico-religious clans with the elephant, rhinoceros, buffalo and tiger as their animal deities. The inscription reads *rama trda (tridha) osa (osha)* 'pleasant and shining in three ways' or 'pleasant shining triad'. The reference is to Agni in his three forms as lightning, sun and fire as conceived in the *Rigveda*. It is, therefore, evident that the Harappans were fire-worshippers and offered sacrifices. Altars for the said purpose were found at Mohenjo-daro even during Wheeler's excavation in 1950 and have been documented, recently, by Michael Jansen (personal communication). The seals also refer to fire-worship and sacrifices. At Lothal, Kalibangan and Mohenjo-daro, remains of animal sacrifice were found in excavations.

The basic concepts the Vedic Aryans and the Harappans had about god, ruler, and the cosmic or moral order were similar. The ruler and god had epithets suggesting that they were saviours—bountiful, mighty, merciful and great. The Harappans spoke an archaic form of the Old Indo-Aryan language and observed religious rites similar to those of Vedic Aryans and bore names which are preserved in the *Rigveda*. In Harappa, Damb Bhuti, etc., post-cremation remains have come to light. Apparently, both cremation and burial were practised by the Harappans (Gupta 1972). They were not phallus-worshippers, as hitherto believed (See Dales in this volume. eds.), nor were their cities destroyed by invading Aryans (See Srivastava in this volume. eds.). The aborigines and even the very Aryans who opposed the Vedic Aryans in their advance east of the Sarasvati after the flood havoc, were dubbed enemies and demons in the *Rigveda*. The *Drh* of the Indus seals, for instance, are none other than the Druhus mentioned in the Rigveda, but the *Papr* (Pipr) and *Dasa* are given demonaic traits in the same text.

An important contribution the Harappans made to the progress of civilization, is the simplification of a complicated writing into an alphabetic system. The Semitics who had trade relations with them appear to have borrowed the Indus signs for their consonantal value, and later, the Greeks added a few signs for vowels, and perfected the Alphabet. The pioneering effort, however, was made by the Harappans.

Transcription And Transliteration Of Seal Inscriptions (Plate I)

1. *ma-ha = maha:* great, chief *(RV)*.
2. *ma-na = mana:* unit of weight : also name of a person (*RV*).
3. *pp-ka = ppaka/paka:* guardian, protector (compare *hastipaka*: *pah* in the Hittite and Harappan languages means, protector).
4. *ppa-ka-ha = pakaha:* (seal) of the guardian.
5. *p-a = pa:* protect, or protector *(RV)*
6. *a-ma ama:* strong (strength, power, violence *RV.*)
7. *ppak-ra = paka - ra:* guardian bestower (*ra:* bestow; *RV*)
8. *phag-a = phag/bhaga:* gracious, Lord *(RV)*
9. *pa-phag-a = pa phaga/bhaga:* protect Lord or God.
10. *p-ka-ae-ba-ka-a = pakae-baka:* to guard from Baka. (Baka Dalbhy is the name of a person in RV).
11. *pata 'phag-ha-rka = pata bhagha - rka (arka):* govern Lord Arka (*Arka* refers to fire and sun in *RV*).
12. *pa rk a-r = pa rka-ar:* protect Arka: praiseworthy (*ar* 'to praise' *RV*).
13. *ba-dra ma-ha = badra (bhadra) maha:* auspicious, great, or chief.
14. *ppr = pr:* protect, or protector *(RV)*.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

15. *śa-da = śada:* eminent *(RV).*
16. *pak-śa-da-ha = paka-śadaha:* (seal) of the guardian eminent (*sad:* be eminent, *RV*).
17. *pa-ra-tr-ka = para-traka:* supreme saviour, or supreme Traid *(trai:* save; *trika:* consisting of three *RV*).
18. *pa-śa-ka-tr-ma-ha = pa saka - tra-maha* protect powerful saviour; great.
19. *hapt-śaś-aśv-a = hapta-śaśa - Aśva: Aśva, Ruler of Seven.*
20. *aśvah-ha = aśvahha* (= *Aśvaka*): name of a prince.
21. *aśva-a-śa-tr = aśva-satra:* horse sacrifice, or sacrifice by *Aśva, (sattra:* oblation or sacrifice).
22. *aśv-pa'' ph-adr-ma-a = aśvapa-bhadrama:* Asvapa, ;most auspicious (*asvapa = groom).*
23. *t'/śa-nn-a = tara'/sanna:* protector/auspicious (*tara:* protector *VS*).

MEANING OF INSCRIPTIONS IN FIGURES

1. *daśa-da:* bestower of ten.
2. *pa'' śada:* protector, eminent.
3. *pa''pappr:* Protector Papr (*Papr* = Paipr is the name of a ruler in *RV*).
4. *pakae-baka:* to guardian from Baka.
5. *pae-dyu-śataha-pa:* to the protector divine of the hundred protector; the protector of the protector of two hundred; *dyar:* heaven; *dva:* two.

REFERENCES

Dales, G.F. 1976. New Inscriptions from Mohenjodaro, Pakistan. In *Kramer Anniversary Volume.* B.L. Eichler ed. U.S.A., 111-23.

Gelb, I.J. 1969. *A Study of Writing.* Chicago.

Gupta, S.P. 1972. *Disposal of the Dead, and Physical Types in Ancient India.* Oriental Publishers, Delhi.

Lal, B.B. 1961. The Direction of Writing in the Harappan Script. *Proceedings of International Conference on Asian Archaeology.* 37-38 (Summaries). New Delhi.

Rao, S.R. 1973. *Lothal and the Indus Civilization.* Bombay: Asia Pub. House.

———. 1979. *Lothal: A Harappan Port Town.* Delhi: Archaeological Survey of India.

———. 1980. Note in *Annals of the Bhandarkar Oriental Research Insitute.* Poona.

———. 1981. President's Address to the Epigraphical Society of India. Indian Museum, Calcutta.

Mahadevan, I. 1977. *Indus Script.* Delhi: Arch. Surv. of India.

Wheeler, Sir Mortimer. 1968. *The Indus Civilization.* Cambridge.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

23

S.C. Malik

Harappan Social and Political Life

A close functional interaction between social and religious subsystems, as it exists now between society, economy and politics, has always been in human societies, except of course, for the beginning of industrialization. Therefore, Harappan social life cannot be interpreted apart from religion and politics. This is evident by the degree of specialization estimated on the basis of craft and technological advancement, population size and the focus of economic subsystems, ritual areas, ceramic centres, etc., all of which we learn from archaeology. This is true not only for urban communities, but also for surrounding rural ones. In fact, while small villages may indicate a single lineage organization, and segmented large villages suggest a multi-lineage social organization; in large towns and cities, the existence of several classes suggests that these were probably organized on a kinship and hereditary basis. Urban social complexity is indicated also by the cemeteries (associated with different grave goods, etc.), and their variations which reflect different family sizes—such social implications are indicated by the variation of house types (in the room sizes, types of hearths and locations, other domestic objects found in actual location), and so on. Socio-political patterning is suggested by the manner in which secular and sacred structures are located.

Religion And Ecology

Archaeological evidence may also be examined within the framework of ecology. For instance, at very simple levels of society, religion is often almost entirely ritualization of ecology, because it helps to placate nature and natural processes in order to secure the best results. But, on moving from the nomadic to semi-sedentary and sedentary agricultural societies, there is ritual elaboration; there now exist rituals for such occasions as harvesting, sowing and ploughing. All these rituals, we may reasonably presume, are likely to have been present during the Harappan period. Thus, as the exploitation and mobilization of ecological surroundings gathers momentum—increased energy being harnessed in greater proportions—religion (and rituals) transit from a level of the ethnic to that of a universalizing system. This is what happened when urban areas came into existence, for now hereditary priesthood with political authority was formed. Rural areas become associated with urban religious systems, increasing the number of agricultural rites and rituals; such as fasts, and other sacrifices as well as domestic rites for individuals.

The location of archaeo-historical sites, of monuments and other structures in the context of ecology is very informative, in terms of the interaction of landscape with religious expressions. For example, the orientation and density of sacred structures, the manner in which cemeteries are utilized and so on, tells us about religious differentiations. This is because, in simple ethnic religions, ecological relationships are intense with nature—plants and animals—and sacred structures are neither widely nor consciously distributed. There are no special objects in structures that may be identified clearly as extraordinarily religious—a great deal depending upon technological efficiency. But as the comp-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

lexity increases, the interaction of landscape and monuments becomes equally complex. The problem here, however, is that monuments are often built beyond economic, labour and technological capacities. Several simpler societies all over the world build monuments beyond their obvious 'simple' organization and the techno-economic levels of their society. Consequently, a series of different questions need to be asked, say when large monuments are discovered. We have to find out how much allocation is given for this work in different forms of societies, viz. does a large group of monuments necessarily suggest complexity and a stratified social order? The fact is that, even while a lack of centralized political system can produce monuments of considerable size, urban life (say the Harappan one) need not necessarily produce comparable monuments. Therefore, in terms of the skills and labour—economic backing—that are apparently available, sacred structures and monuments may be built on the basis of continuity of ideas along various transitional phases. This is why monuments, temples, and other structures that we see not only in India, but other parts of South-East Asia (for instance at Angkor-Vat), are built beyond the capacity of that society, leading to ecological imbalances and even the breakdown of societies, empires and civilizations.

At any rate, what we learn from such studies is that in complex ethnic and universalizing systems of religion—as perhaps was the Harappan one—diffused patterns of structures over a wide area are seen to function, both as administrative-political, as well as religious authority. In this case, at the village level, household and other objects may also be seen as functions of the same socio-religious diffused patterns. The presence of sacred areas, at Harappan sites, clearly indicate this differed pattern, as we see from the evidence of ritual structures at Kalibangan, and elsewhere, of the 'bath' and the 'pool'; and so on. The absence of singled-out gods, deities, unusual religious monumental structures is marked in the Indus Civilization. It indicates clearly the absence of strong—unitary—religious or politico-religious authority such as that of king—of autocratic regime (both religious or political).

The interaction of landscape patterns, in the context of socio-religious subsystems, enable us to interpret the world view in particular societies. For, it is this world view which often affects the planning and orientation of land patterns, whereby cosmic ideas or the ideal pattern is applied to the earth's surface. For example, if the universe is considered to evolve from a central point, this results usually in the north-south and east-west orientation (indicated by Hindu temples as well as by the patterning of the Hindu villages). The grid-pattern found in Harappa or in a few other cities of West Asia, such as Ur, suggest an ideal cosmic plan in which everything is related to other things. Again, cremation as it exists amongst Hindus and other communities, more likely suggests a cyclic world view. Contrarily, burials and inhumations suggest different viewpoints. In the same way, the man, plant and animal relationship may be understood by seasons and crops or the rhythm of nature whereby ritualization and specialization are incorporated into this pattern. Thus, different burials and settlement patterns which indicate the rich and poor social classes or castes, implies that its maintenance possibly required some form of food taboos of pollution and purity during various occasions, and so on (Sopher 1967).

Funerary Remains And Their Interpretation

In an article in *World Archaeology*, Peter J. Ucko (1969) discusses generalizations about funerary and burial practices in terms of ethnographic parallels. Briefly, he goes beyond the very simple one-to-one correlations of archaeological data, i.e., it is assumed that funerary data form a significant indicator of conservatism. But he shows that this is certainly not true, for one culture may incorporate both burial as well as inhumation practices, including cremation. Moreover, different rituals exist on the basis of status, sex and age; and many societies often change their practices when they move from one ecological region to another. This is for purely functional reasons since no society is static over a given period of time; and while in some religious beliefs and funerary customs change, in others this may not be so. Therefore, by seeking historical and ethnographic parallels in India, such insights may provide us with ideas about funerary practices of the Harappans. Consequently, while these arguments do not provide actual proof, they do provide us with multiple possible explanations.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

These explanations, narrowed down, become possible alternatives to be re-analysed and tested, for validity again in the field.

It is noticed that, in various parts of the world, 'poorer' and 'simpler' societis often tend to have very rich burials (like the case mentioned about monuments in the previous section) well beyond their standard of living. Again, in the decline of a civilization, burials and tombs tend to become rich and opulent. However, in the upswing of an economy and civilization, these practices become 'weaker'. Also, while in some societies, social differentiation in burials often exists, in others, both equality as well as inadequate care of the dead without any special practices have been noticed. However, a common feature in most societies is that burials or similar practices are distinguished most often on the basis of number, sex and age of the individual. All these factors influence the variety of funerary structures, rites and rituals. For example, in some societies a new-born receives no burials, while the young are often buried within the camp and those a little older at the edge of the corner of the settlement; and, death due to such different causes as disease, natural causes or drowning, etc., often requires different funerary rites (Gupta 1972). Finally, archaeologists have often differentiated burials in terms of their orientation and direction explaining them in terms of spiritual or cosmic beliefs However, orientations may be merely in relationship to the village, to the sun or to the moon, or even as in the case of Egypt, according to the flow of the river. Thus, these and other broad generalizations may be applied to the evidences of the Indus Civilization.

Evolution Of Peasant Society And Civilization

While an important characteristic of the Indus Civilization is its urban life, surrounding villages, as well as the ones in the hinterland, are no less important in understanding socio-political life. This is because, rural areas have not only supported but have often contributed to the socio-culturural development at the urban-rural level. Consequently, generalizations about peasant societies need to be understood at the level of human evolution, at the same time distinguishing urbanization in terms of industrial and pre-industrial towns. But the fact remains that all cities are built upon peasant society albeit the relationship at the pre-industrial level is quite different to the one which exists in the industrial age. Eric R. Wolf (1966) says that of the several methods for examining peasant villages, many until now have been wrongly used in interpreting socio-cultural generalizations about village life. Some examples of mistaken generalizations are: (i) villages are tradition-bound; (ii) they are simple aggregates; and (iii) therefore, in this sense, peasants are alike all over the world.

Wolf also tells us that peasantry is a wide-ranging complexity, starting from simple settlements to very large ones that are indirectly or directly linked to complex urban groups by a series of networks. These networks exist even at the hunting-and-gathering levels, for these societies are also linked both to villages and cities. In short, these network exchanges clearly imply their participation in the wider economic, religious and other systems — no society being completely isolated specially in the context of a civilization.

However, while all these linkages are based on complex socio-kinship relationships at simpler levels, at urban levels, the socio-cultural and politico-economic linkages are more complex For example, in the case of Harappa, networks were probably governed by centralization, and some control of the means of production, labour and exchange of goods and services (which are not anymore directly controlled, as was the case at the simpler levels by the producers). Governance is by both, economic and political systems of productive organization, which enforce economic controls that provide other incentives. All these facts are present in all forms of pre-industrial market economy, which thrives on surpluses produced by the peasants. In other words, a division now exists between the non-producers who control and are in authority, and those which represent large segments of the population of agricultural areas. It may be noted here that, even though the basis of subsistence-economy continues to be the same as before, yet it is the complexity of organization and the existence of subsystems within the larger urban-rural system that clearly demarcates this stage of civilization, as the Harappan one. Hence, the problem of surplus is to be viewed not in terms of mere economic surplus but also social imperatives that are closely linked to economic and food surplus. It has been discussed elsewhere (Malik 1968) that

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

surpluses are produced for social occasions like marriages and other ceremonies and rituals that are often directly or indirectly connected to urban groups. These are indirect at an earlier stage, while systematic relationship come into existence as the rural-urban continuum institutionalizes into a systematic relationship. In short, peasants are now involved and governed by factors which are outside their direct needs and way of life; and, in return for their surpluses, they receive other goods and services of a non-agricultural nature.

We have thus to imagine these kinds of networks of exchange of goods, ideas and labour; all of which are more than likely to have been essential for the functioning of the Indus Civilization, forming the core of its existence. This is how large cities have flourished from the beginning, except until the time when industrial economy brought in full fledged commercial enterprise in these areas. Bearing in mind this stage of evolution, concomitant socio-political developments must be in existence in the Indus Civilization. But in peasantry, there is variation in the ideological (world views) or value system whereby symbolic forms give order and a meaningful universe of various inter-relationships as reflected in the socio-political order. Ideology is very important in dealing with the various tensions that arise in the day-to-day working of any society, because the sacred, ceremonial and other ritual forms become essential in order to integrate not only peasant society but also urban society. Specific interpretations will have to be diligently worked with the data.

Evolution And Kinship Systems

An interpretation of social organization involves us—in terms of different evolutionary levels ranging from simple small-scale societies to large ones with extreme specialization—with kinship systems. Anthropologists, from ethnographic data, have been able to make direct correlations, in terms of the evolutionary development, to kinship system. The work done by George P. Murdock (1945), and Service (1971), suggests that kinship becomes intricate in terms of technological and economic developments. They have viewed the problem at the conceptual level, seeking the possible relationships of kinship to social organization. Service's views are quite different from those of most others; namely, he views kinship in terms of two basic concepts—familistic and non-familistic. In the former, kinship names are based on social position in a group of kindred or their derivatives; while in the latter case the terms are status positions which are based on occupational specializations, political offices, social classes and the like. He goes on to correlate the two major divisions with egocentric and socio-centric levels respectively, even though both cut across each other at various stages. This is an extremely brief summary of his conceptual framework, on the basis of which he has further classified kinship terms into four subdivisions, and formulated four evolutionary stages. The first being that of a small, isolated, primitive level of society, when terminology is chiefly egocentric and familistic, since initially, internal social relations are predominantly face-to-face and consistent. But, second, with the growth of complex societies, when intensive agriculture begins and tribes become supra-tribes, then non-familistic terms also emerge. This is because, now, not only domestic families but larger families and other relationships of groups also begin to be formed (this is a transitional phase that leads on to specialization.)

The third stage is important for us because it is the beginning of city life—of both pre-industrial type. There is the emergence of complex socio-economic classes, of political or bureaucratic offices, and of the differentiation of social classes along hierarchic lines of the rich and the poor. Kinship terms are egocentric and non-familistic. Both terms arising out of a hereditary position, or because of relations to other persons of status or titles that are socio-centric. Supra-kinship orders emerge, and these refer to non-familistic status even though both egocentric and socio-centric familistic terms continue to be used. New terminology that emerges is due to corporate groupings such as 'castes', classes and guilds, that have their basis on the occupational basis of specialization. This is, of course, a general definition of this ideal state in an evolutionary order. But, in fact, this stage covers several hundreds of societies that exist and are existing throughout human history and represent extreme heterogeneity. For example, this stage would cover both supra-tribal groups and infra-industrial systems, and it not only covers Harappan type, Mesopotamia and Greece but also colonial empires and feudal kingdoms of much later stages.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

We are not concerned with fourth stage at the moment, for it belongs to the industrial society.

Sex And Social Behaviour

As a consequence of adaptive response to varying conditions of culture and economic life, four hundred societies drawn from all over the world and from every level of cultural complexity by Murdock (1965), were examined and classified in terms of 'cultural correlates of pre-marital sex behaviour'. These are briefly: the restrictive intermediate and permissive norms of behaviour which have been correlated to a subsistence economy, technology, demography, politics, religion and social organisation (the two primary categories at the subsistence economic level are food producers and food-gatherers; farmers—further divided into three sub-categories ranging from pastoralistic, intensive tillers to small tillers—deriving more than half their total food supply from agricultural or animal husbandry and food gathering).

It has been found that restrictive norms of sex behaviour are greatest in the intensive tillers and diminishing in opposite proportion as one moves away to the level of food gatherers. The explanation given is simple intensive agriculture requires an exceptionally high level of discipline and industriousness; for restrictions enable the youth to cultivate specialized skills (which are less needed at the other end of the continuum). These restrictions are further intensified within the large system of the town or city. Similarly, specialized technology, religion, intense demography and cultural complexity imposes highly restrictive norms of socio-sexual behaviour—holding equally true at the level of political organization.

The only difficulty is that we do not know the exact form the Harappan political organization took. But, as we shall show later, there does not appear to be an 'empire' as many seem to think. Instead, there were probably several local or small 'state-like' political organizations, such as petty chiefdoms (Malik 1968), with emphasis on local authorities or administrative units for rules and regulations. Nevertheless, the more the concentration of power, the more restrictive the norms become. Again, at the level of religion, since there is no one single or high god or super-power religious concentration, central planning of the 'empire' type is absent. But there was perhaps regulation of social norms and sex behaviour because that is the only way certain marriage standards remain operative without coercion. Gods of 'lesser' or of equal power may be there, but here, restrictive norms become less intense. Similarly, at the level of social structure, it has been noted that societies with matrilineal customs tend to support permissive norms of sex behaviour, and so on. Thus, if it is possible to horizontally excavate several generations of house, the material and artefacts thus investigated, may give us insights into the rules of social-kinship and sex behaviour. The importance of the above generalization is in providing culture-frames of reference, and we may further refer to levels of cultural complexity on a world-wide scale, including Indian society, as attempted by Murdock (1973).

Evolution And Civilization

In the interpretation of socio-political life, it is essential to discuss the origin of the Indus Civilization in the scheme of general evolutionary process whereby village communities were transformed into cities (Adams 1966). The origin is to be discussed not in the sense of inspiration or ideas, but within the broad features of how urban societies came into being as socio-cultural processes. Urbanization being related to significant economic interchanges represents radical socio-political change. This exchange of trade, material goods, etc., was correlated to socio-religious and political ideas that influenced the regions ranging from the Indus Valley, and even beyond (Lamberg-Karlovsky 1969). The role of intermediary regions which gave impetus to trade, the control of exchange of raw material, metal technology and various goods is no less important. In short, as Childe (1952) indicated earlier, all this implies evidence of an efficient means of production in metal technology and alloys, etc., which were systematically exploited, leading to the formation of non-agricultural classes, and the development of some form of religion—political or socio-political authority. This happened in the villages also, for the peasants were now closely associated with urban areas. These inferences are supported by the evidence of complex planning which is revealed in Harappan cities, further implying interdependence of various groups within some common framework of socio-political ideas. At the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

moment there is insufficient evidence for a single, supreme authority that governed the entire civilization. But clearly each city and its associated villages did require a social ruling class which could maintain discipline in socio-civic life.

It is worth recapitulating briefly, the kind of economic-technological changes which are characteristic of this stage of the evolution of urban life. For instance, apart from ruling classes there were merchants, traders and others who carried out commerce both internally and with foreign areas (implying several go-betweens—between the main authorities and the masses). Other specialists in architecture, astronomy, mathematics who were necessary to carefully design the purely physical aspects of city-planning. As stated earlier, since one or any other form of coercion is not seen, it suggests some socio-religious means of sanction, which provided incentives to various classes to maintain their positions, by hereditary primogeniture means. In any case, we know that till the beginning of industrialization, such socio-religious means were the major controlling factors that enabled this continuity of tradition, or craft, technology and other occupations. This heritage was passed from father to sons, and also maintained the special social identities which sustained the general structure of society. This was also the case in rural settlements. It is these kinds of systems of ideas of socio-religious and political control which were probably present with variations not only throughout the Harappan culture but also in the neighbouring areas towards West Asia. Therefore,it is not necessary to bring in ideas of imperial authority for which no evidence exists.

The above inferences seem logical in terms of the current definition of civilization. While the definition of civilization has been more or less common since the discovery of West Asian and other civilizations, the discovery of the South American civilization has created problems about these definitions. So that, while basic archaeological definitions may hold good, today even these are contradicted, in many ways, by the actual evidence found in different parts of the world. For example, urban life and writing, two indicators of civilization. This does not apply to the South American civilization where complex urban areas with monumental architecture exist without evidence of writing, and where even subsistence-economy is basically different. This is why scholars like Robert Adams have defined civilization as functionally interrelated areas of social institutions which imply class stratification, of power and economic focus; these being marked by a highly developed degree of ownership or control of main productive resources in such a way that politico-social hierarchies complement each other in administrative territories organised into urban units. While Adam's definition is based on characterizing Mesopotamia, it is clear that we may develop a similar complex model for the origin and formation of Indus Civilization.

It is clear that civilization was not invented in one area and then spread to the other, nor was there a simultaneous explosive emergence. Instead, cities,towns and villages ranging at a certain point of time from West Asia to the Indian subcontinent were interacting within various civilizational spheres at the levels of cultural, economics technology and socio-politics. Similarly, these influences spread to other parts of India, interacting with other cultures whereby certain ideas spread in time which gave a distinctive 'Indian style' of life (Malik 1968). Thus, urban revolution may be looked at within this socio-anthropological framework of not only man's interaction with the environment at a pre-urban stage, but also in terms of the regional distinctiveness which was provided due to geographical features. It is the governance of this complexity in human interaction which may then be understood and expressed in the political spheres. We may thus say that there was, by Harappan times, a system of common ideas which prevailed over a vast area not only in the main Harappan areas but also in the neighbouring areas of the subcontinent, beyond the Harappan sphere of influence. It is very clear that each geographical area, such as in the Indus Valley, Rajasthan, Gujarat there is a socio-cultural continuity as reflected in various agricultural crops, craft technologies such as in pottery, the way houses are built in villages and the material used, and so on.

The above are the kinds of generalizations which we may make by using (and understanding) various propositions from anthropology, sociology and other social sciences. Of course, as they are applied to different kinds of evidence of archaeology, many errors will be found; and revisions with regard to interpretations, hypothesis, and propositions will have to be carried out by

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

not only further field testing, and new data, but also by the logicality and consistency of the arguments.

Discussion

The above discussion of certain general propositions may allow us to deduce and infer the intangible socio-political aspects of Indus Civilization, by briefly recapitulating some of the well-known major features, and some existing notions—with our own critical comments—about socio-political structures which have been mentioned by various scholars. This is given below:

The Indus Civilization reflects a highly developed civic life, that has been described as monotonous (Piggott 1950) because of the rigid regularity of standardized block after block of burnt-brick houses with broad main streets (the drains are well planned and kept clean, and so on), along with a pictographic script (as yet undeciphered). City settlements range in an area of five to seven kilometers in circumference and many of these general features were also present in Mesopotamian cities. But in Harappan cities characteristically absent are any 'special' monumental structures. Several Harappan features are present in what has been called the pre-Harappan settlements—both in the Indus valley region and in the Rajasthan area. Even villages have maintained continuous uniformity, and have common patterns. But archaeological evidence does indicate regional differences both at pre-Harappan and Harappan sites. Among the variations noticed are ritual objects, gods and deities, fire altars, etc. But, by and large, there is uniformity of material products, general planning, etc., which is reflected in the cities, public buildings, defence walls, large fortifications, granaries and standardization of material equipment through mass production. This is despite the regional diversity for, on the whole, there is some uniformity of pattern. This implies that not only pre-Harappan but also the classical Harappan tradition of city planning and its concomitants have been found in a very widely separated area.

In interpreting socio-political life, this uniformity of patterns, as briefly mentioned above, has suggested to Wheeler (1968, 1969) and many other scholars, including S.R. Rao (1973), that there was a central empire with a kind of authoritarian government—or a totalitarian regime—which the dullness, uniformity and simplicity perhaps indeed implies superficially—of a disciplined society. Rao goes on, for instance, to speak about the spread of spiritual ideas when this political 'empire' broke up, and glorifies the civilization—by its exotic glory. But these and other statements suggest to us that interpretations uptil now lack any correct theoretical knowledge about the functioning of human societies and their evolution through time. For example, Rao (1973) goes on to suggest that the 'cultural unity' of Harappan culture was brought about by the political unification of four provinces; similar arguments being given for the 'down fall of the empire' when there was a wide diffusion of 'Harappan technology, so that spiritual ideas went down to the lower Krishna valley in the South'. In fact, he goes on to say that economic and socio-political discipline was enforced by uniform laws which made the Indus Valley people 'pioneers in founding an empire with a distinct personality'. In fact no clear-cut evidence suggests these kinds of inferences.

Thus, without going into further mention of different kinds of interpretations, we have attempted to indicate different directions, through some logical means employing social science concepts, in which Harappan social systems may be seen. We will give an example. In terms of evolution, the beginning of urban organizations indicates a distinct change from the earlier simpler societies which are kin-based, to a hierarchy of socio-economic structures leading to a stratified society. Now, some form of political organization is necessary to control the division of labour, etc. But such control as that of an 'empire' is not necessarily invoked, though this is easier done.

Similarities in social and cultural patterns may be because of the use of similar political system—'ideas in the air'—and authorities of administrative units in different city-areas. This can be both due to the spread of certain ideas (with the evolution of city civilizations) and/or the evolutionary development of socio-cultural complexities. This is what brings about uniform functional interaction of institutionalization to form distinct cores of social system. The above statement seem more appropriate in the context of contemporary knowledge about organization of successive patterns, within the wide ranging village-urban

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

settlement complexities. Moreover, political authority does not necessarily require coercion, because it controls through means of a complex social stratification and institutionalization of norms and values. Material-culture uniformity and planning does not necessarily imply any unitary common socio-political authority (today many cities in the world have a common pattern of planning and arrangement, but the socio-political systems on which they have been built range from democratic to totalitarian ideas). Thus, in our interpretation we have to evolve more complex and refined methods and approaches than uptil now, specially those that move beyond economic and technological inferences, to correlate wide-ranging variables.

To illustrate, not only are urban areas insufficient for providing us with an understanding, but that we must look towards pre-civilizational—rural—levels in several parts of the world before we can understand evolution of socio-political complexity, and the growth of social stratification. Thus, when urban areas begin, class society and hierarchical differentiation emerge due to the means of production; this is not in the sense of class-consciousness or an interclass struggle, but in the sense of a severe reduction in general physical and social mobility. Subsequent to this, property relations develop not only in terms of social stratification but also as forms of distinctive political authority. But this authority is seldom—at Harappan levels—and solely in political terms, for it is interrelated with religion or religious authority which maintains rites and rituals. All these resources are controlled, organized and maintained by certain kinds of responses which are conditioned in the people by ideological (religion) and societal (kinship, etc.) means.

Again, social differentiation based on kinship pattern that lead to social groupings of class - society in urban areas may be analysed quantitatively by looking for parallel generalizations within the Indian subcontinent; such as in the development of the class-caste system, of class guilds and their internal structure which also follow kin-based ties in the later socio-political systems of India. The formation of these larger social groups takes place in terms of both informal and formal modes of social relationships because families—and their lineages—maintain identities by the hereditary handing down of caste-class traditions of their profession. This is one of the chief ways whereby the uniform pattern of planned areas in the cities, divided into specialized areas, must have maintained the continuity, i.e. tradition passing through descent rather than by means of superimposed sanctions of political leadership. The specialization of hereditary arts, crafts and technology is normal in corporate groups when occupations are handed down from father to son. This has been the case throughout human history, except until the last two centuries which have been effected by industrial civilization.

Summary

The above mentioned brief inferences have been made in some form of the other by Wheeler and others. In summary, our attempt is to indicate different approaches both for similar and different inferences. To illustrate, we have suggested that continuity of residential groups suggests hereditary occupational traditions. If this was not so and was instead, mobility in social life—it would have been clearly reflected in the discontinuity or changes in material life. Changes, specially as those which we notice towards the end of civilization—whatever the causes—brought about a strain on the socio-political systems and the economic base, which had probably, by now, stretched beyond its sphere. At any rate, social planning is implied in the planning of cities, which reflect acute awareness and specialization, and what Wheeler (1966) has called 'meticulous planning' where 'the use of calender and systematic accounts were kept, of inventories of goods and other items' whereby civic and social order was maintained. All this clearly reflect—apart from political inferences—social rigidity and disciplined behaviour that was maintained through social norms and values, rather than by political 'empires'. The existence of religious-cum-political leadership of the priestly class is more likely than any secular political authority. Lack of political authority is also indicated by the lack of any outstanding monuments or supreme gods and other supreme sacred objects, for, the tombs and burials also do not suggest any higher authority or totalitarian government; instead, some kind of 'middle' class urban people were present. As Wheeler (1969) has said, 'the bourgeois aspects of a middle class in this civilization seems more likely here than in West Asia'.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Nevertheless, the Indus Civilization does suggest socio-political groups which were critical and selective of their own society 'where it was going and what it was about'. The 'disciplined and dominant intellect' of this civilization is perhaps the 'most enduring imprint left upon their modern situations'.

REFERENCES

Adams, Robert. M. 1966. *The Evolution of Urban Society.* London.

Childe, V.G. 1950. The Urban Revolution. *The town Planning Journal.* Vol. 21; 3-17.

Deetz, James. 1965. *The Dynamics of Stylistic Change in Arikara Ceramics.* Urbana.

Gupta, S.P. 1972. *Disposal of the Dead, and Physical Types in Ancient India.* Delhi.

Lamberg-Karlovsky, C.C. 1969. Trade Mechanisms in Indus-Mesopotamian Interrelations. *Journal of the American Oriental Society.* Vol. 92; no.1; 229-49.

Malik, S.C. 1968. *Indian Civilization: The Formative Period.* Simla.

———. 1974. *Understanding Indian Civilization : Frame-work of Enquiry.* Simla.

Murdock, George P. 1945. *Social Structure.* New York.

———. 1965. Cultural Correlates of Premarital Sex Behaviour. In *Process and Pattern in Culture.* Robert A Manners, ed. Chicago.

———. 1973. Measurement of Cultural Complexity. *Ethnology.* Vol. 12; 379-93.

Piggott, S. 1950. *Prehistoric India,* Pelican Books.

Rao, S.R. 1973. *Lothal and the Indus Civilization.* Bombay.

Saraswati, B.N. and Behura, N.K. 1966. *Pottery Techniques in Present India.* Calcutta.

Service, Elman R. 1971. *Cultural Evolutionism: Theory and Practice.* New York.

Sopher, David E. 1967. *Geography of Religion.* New York.

Ucko, Eric R. 1969. Funerary Remains and Their Interpretations. *World Archaeology.* Vol. I, 2; 269-270

Wheeler, R.E.M. 1966. *Alms for Oblivion: An Antiquary's Scrapbook.* London.

———. 1968. *Indus Valley Civilization and Beyond.* London.

———. 1969. *The Indus Valley Civilization.* (3rd ed.) Cambridge.

Wolf, Eric. 1966. *Peasant Society.* New York.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

24

Y.M. Chitalwala

The Problem of Class Structure in the Indus Civilization

The Indus Civilization has been a topic of intensive study by scholars all over the world for over half a century. A series of excavations and explorations have been carried out and many new advances have been made with regard to the distribution, chronology and evolution of this civilization. However, in spite of considerable amount of scholarly work the character of Harappan life—its basic institutions and social and political organizations—still remain shrouded in mystery. Much has been done in the context of the undeciphered Harappan script and it is usually thought that, once the code is broken, all will be known about the life of Harappan people. However in view of the fact that the inscriptions, mostly on seals, are very brief, this hope may be belied and, beyond knowing a few individual names, we may still be at sea in understanding totally the Harappan cultural process.

By putting a few related bits of the jigsaw puzzle together, a tentative attempt is made here to examine whether Harappan society was, in fact, encumbered with a complex and hierarchical societal order that incorporated a class structure with economic undertones. It would be naive not to expect just such an arrangement in a highly urbanized social organization that the Harappans had managed to evolve. The collective life they lived within the confines of walled towns and cities was, in a way, the separation of a class from the wider canvass of Harappan existence that dotted the countryside in constellations of rural settlements. What precisely was the relationship between the urban and rural phenomena of the Harappan culture is difficult to detail at this stage; but it would be fair to point out that the tentacles of urban growth went deep into the sustaining energies of the countryside. The urban-rural dichotomy of nature, obtaining in the Harappan context, suggests that the economy developed on two divergent but complementary lines. On the one hand was the collective urge to dominate, exploit and prosper. On the other, the scheme of life developed on the considerations of survival, preservation and perseverence. The first order had a highly developed superstructure with manifold needs basic to its existence. The second was the primordial, self-sufficient and rustic stage of life having, nevertheless, a formative potential for the process of urban growth. Thus, a perfect stage was set for the establishment of an economic tradition that spread like a cobweb on the Harappan countryside with the city occupying a central, spider-like and commanding position.

The Harappan situation has its rationale not so much in what is urban and rural, but in the very direction of life that was in the shaping for centuries past. The transplantation of many urban elements to a rural milieu in the early phase brought about fundamental changes in the general outlook. Much of what was rural was harnessed to give sanctity to what was basically urbane and secular. The villager who had propitiated nature in the form of a deity and who had for long recognized the power and potency in the sinewy muscles of animals like the bull, had to renounce this delectable position for good. With the growth of an urban concept, the perspective of what man could do had changed. The expansiveness of the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

situation had to be recognized and so there developed an inherent inclination to transfer the semblance of godliness to the temporal order, so as to cast it into a role that could well be compatible with the grandeur of teeming, tangible and pulsating expectancy of city life. This is well illustrated by the early Harappan phase which supplied generative impulses to future urban expansion. The phenomenon was soon to dominate human life to such an extent that uniformity and standardization became the fundamental norms of the society. The rural animism which was so vividly depicted on early Harappan pottery, serving as the basic material expression of a rustic outlook, was soon taken over by the urbanized elite to serve an enhanced role representing the refined version of a tame but limitless might of an organized state structure. The Kot Dijian bull deity with delicately balanced horns is nowhere in evidence in the Harappan ceramic assemblage, nor is there any indication of the primeval desire given to rustic expression of nature's bounty. What is left is stark and *en masse* standardization and strict punctuality of shape and decoration. Only rarely is the monotony broken by the blanket embellishment, as in the case of some of the 'S' shaped jars, verging on the luxurious outpouring and in conformity with the heightened level of taste of a distinctive class. The depiction of animal potency is now promoted to a higher social and political status and the medium chosen for this is also different as it is meant to remain out of the plebeian reach. This would explain why the Harappan seals are found only from bigger sites. They are more in the nature of tokens of power and prestige than mere badges bearing their owner's name. If the function they were supposed to perform had been simple, there is no reason why so much artistic skill went into their manufacture. There can also be no logic in allowing ordinary citizens to utilize these seals in the manner of title-deeds for commercial transactions when the political machinery did not have anything to represent itself with. The sealings found in the Lothal (Rao 1973) 'warehouse' were more stamps of state intervention than documents vouching for a merchant's right to the goods they were originally attached to.

As far as the hierarchical class structure is concerned, we have two sets of relationships. First, within the city itself, there is a sort of class division peculiar to the urban nature of the set-up, which will be considered first. Secondly, there is a hierarchical,geographic, economic as also social relationship involved in sofar as the urban-rural continuum is concerned, which appears to be vital for the survival, growth and decline of the civilization.

In the city with its consistent pattern of planning, a certain degree of geographic mobility is found as the ruling elite occupied a position of privilege and sublimity. At Harappa, Kalibangan, Surkotada and Lothal, the city structure is delimited to accommodate the elevated spatial zones which archaeologists have christened the 'Citadel' and 'Acropolis'. In the case of Kalibangan (Thapar 1973), the citadel is especially reinforced to give an extra bit of security and privacy to the occupants. This would indicate that by the very nature of their status, the elite occupied a distinct and segregated position of power and prestige. Further, the anxiety reflected in security arrangements would show that the economic and the political order which the rural dispensed was not always to the taste of the commoners and there were risks involved in the administration of certain social and economic institutions. In short, the ruling elite and the masses were not always on the best of terms. Therefore, some degree of coercion is presupposed by a body of persons in the employment of the state.

Whether each city had a well organized police administration in the likeness of civic administration, we do not know. However, the uniform and specific standard of weights would suggest some form of state supervision in this respect. At some of the Harappan sites, small rooms adjacent to bigger structures have been called 'guard-rooms'. Barrack-like structures have been identified at Lothal, Mohenjo-daro and Harappa. Moreover, if the Harappans were indeed imperialists who, as Sankalia (1973) maintains, colonized the peripheral areas outside the Indus Valley proper, we cannot but think of a series of garrisoned and fortified outposts to hold the colonies under control. In this respect, we are fortunate in the excavation of J.P. Joshi (1974) at Surkotada in Kutch which, according to him, was a 'defence complex' guarding a vital route of communication between Saurashtra and Sind. One more occupational class (of soldiers) can

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

thus be added to the list. As this class served as the basis of power and exploitation, it must have enjoyed an enhanced status and was probably maintained on kinship lines keeping in view the total fidelity the situation demanded.

The manufacture of pottery, beads, metal artifacts and inlay work was done by whole-time artists or specialists engaged to cater to the mass-demands of the city-dwellers. They must have formed a distinct class on occupational lines. What precise position they occupied in the class hierarchy is difficult to indicate, but it is evident from the uniformity and mass nature of their products, that they were not high on the social ladder.

As far as international trade was concerned, it was more a state enterprise than a private affair and, doubtless, vigorous controls were exercised. The fact that the Lothal 'dock' and 'warehouse' were situated almost in the shadow of the 'acropolis' may not be wholly without significance. The sealings found had impressions of packing material on them, suggesting their use on the merchandise meant for export and, as has already been pointed out, they represent state intervention and supervision rather than a merchant's ownership. If there was at all a capitalist class, it was subordinated economically to the state and in that way helped maintain the socio-economic and political *status quo* by playing the intermediate role between the political machinery and the working class. Rao (1973) found that the 'Lower Town' at Lothal was shared by both the general populace and the merchants with a close distribution of residences. On the basis of this, he concluded that the society was not class-ridden. However, this very same evidence can be read differently. The well-marked dividing line between the rich and the poor, evident from the size of the houses, indicates a class-structure. The property rights enjoyed by the rich and their control over the means of production set them apart from the general population. It is possible that the small houses of the workmen, adjacent to the big mansions of the merchants or industrialists, belonged to the latter and were rented out to the former. The other reason why these two classes lived in such close proximity to each other might have been the necessity of close supervision underlined by the nature of the relationship involved between the two classes. This is illustrated by the 'bead factory' which had a screen wall built around it and thus had a distinct ambient of its own, segregating it from the mainstream of city life. The freedom with which the owner of the factory wielded his power within the walled premises, epitomized, to a certain extent, the power of the 'Acropolis' in a wider context.

The urban-relationship and its bearing on the class structure is yet another aspect of Harappan society. The underlying sense of dichotomy, as already referred to, is in the degree of development of civic standards and the harnessing of economic forces and hence we get a situation with an implicit difference in the social organization of these two stages of life. The urbanized city being expansive, with a great deal of craft specialization and corresponding mass demands, rendered the social mobility rather dynamic though the restrictive influence of the state intervention would breed class differentiation on the occupational level. In this context, the basic social mobility is in the case of an urban outlook. Urbanized civic life had, in the case of the Harappans, become an attitude of the mind rather than a purely organic way of looking at things. The standardization implicit in the urban order, however, reduced the scope for individual incentive and identity in an atmosphere that paraphrased corporate and mass endeavour. Whether this mass labour had any political or ideological basis we do not yet know. But fortified walls, citadels and huge mud-brick platforms suggest a well-directed application of labour. The significance of this lies in the fact that the less the mobilization of available labour the less is the economic potential of Harappan settlement and, in this way, a hierarchical order from small hamlets to big cities existed with social and economic implications.

In the first category can be included the city with its massive urbanized growth, thus serving as a channel for labour output. The process of growth by the circumscribing weight of the fortification wall and, hence the more the emphasis towards city expansion, the more the structural dimension assumes verticality. That this stage had already been reached at both Mohenjo-daro and Harappa is clear from the remnants of staircases suggesting houses with more than one storey. The importance of this development lies in the fact that the process of intensification, in so far as the economic, social and political aspects of the civilization are concerned, was already under-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

way and hence with the expansion of an economic base due to an increase in population, social stratification must have become more rigid. This is evident from the various sizes of structures that have been unearthed from the mature phase of the Indus cities. Also, there was an increased awareness of hygenic living in a crowded atmosphere evident from the strict enforcement of civic standards. The Great Bath at Mohenjo-daro and the well-maintained straight-running streets, closed drains, private bathrooms, and soakage pits are all indicative of an accelerated pace of urbanization with intensification in other aspects of the Harappan life. That the political authority was becoming more and more involved with the enhanced stature of day-to-day existence, is also apparent and probably the right to urban citizenship was sanctified in order to make the political power rooted in the cities, more respected by the populace. A citizen of Mohenjo-daro might well have boasted as did the citizen of Rome: 'Civis Romanus sum' ('I am a Roman').

The second category of sites consists of intermediate towns like Rojdi, Surkotada and Banawali, the last being in Haryana. As far as Rojdi is concerned, the existence of multi-roomed structures suggests that the extended family was the basic economic unit. Even among these town folk, there were the rich and the poor, as is testified by the find of a number of gold beads. Probably the chief occupation was agriculture, the site being situated on the margin of the most fertile tract in Saurashtra and along the banks of the river Bhadar. Thus a class primarily engaged in agrarian pursuits must have occupied a specific position in society. The manufacture of the standard Harappan pottery presupposes a class of potters who were exclusively engaged in practising this craft. In the case of Surkotada, Joshi (1974) found 'fourteen groups of structures of house' with an average house comprising five interconnected rooms. This would further confirm the fact that the extended family was the basic economic norm. It is probable that small towns specialized only as a part of a self-sufficient economy. Large storage jars reported from Rojdi and other sites indicate that the surplus remained in the towns and was not frittered away as a price for the relationship with a cosmopolitan centre. Therefore, in a hierarchical order, towns enjoyed a degree of autonomy vis-a-vis the state structure, though the same did not hold true of small hamlets and villages. In Saurashtra, in some cases, villages exist in tight clusters round a primary settlement. Clearly, therefore, they were in a form of symbiotic relationship with their bigger counterparts, and it is possible that the intensive pattern of land-use which thus resulted was taken advantage of by a nuclear settlement at the expense of the satellites. This would to some extent explain why smaller Harappan sites look so poor and 'degenerate'. From sociological point of view, they had less cohesion as there was less economic collectiveness. Social mobility being at its lowest, there is not much in the way of social stratification. Freedom, to a certain extent from the weight of regulations and their poverty, precluded any complex specialization-oriented society, and the people formed a kind of class at the lowest rung of economic and political stratification. Thus the villages form, in our scheme, the third and the lowest order.

By fourth millennium B.C., as noted by Fairservis (1967), there was already a developing predilection for moving into cities not only in the Indus Valley but also on the Iranian plateau and the regions around it. This exodus from countryside to urban centres may partly be due to the decline of resources and exhaustion of land and vegetation persistently in use for hundreds of years. The unreliability of output from the villages is amply proved by the presence of granaries in the cities which stored yearly surplus against the lean years. This supremacy of political power was thus proportionate to the procurement of the surplus. The assumption that the climatic conditions in modern Sind have remained more or less the same since the time of the Indus Civilization and earlier, would in effect, make drought and famine conditions not too infrequent. A calamitous famine, or a few consecutive droughts, would be enough to bring about the exodus of the rural population to the cities which had a reputation of being the cornucopias of stored food. Such a situation would undoubtedly undermine the fabric of society. Whether this indeed happened in the case of the Indus Civilization, we have no means at our command to indicate. Nevertheless, the probability of such a situation is far too striking to be ignored.

In this context it can be visualized as to what could have happened if swarms of villagers descended like locusts on the cities. Joined by the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

gentile class of the city itself, they could easily have overwhelmed the political order. The so-called massacre at Mohenjo-daro might have been the result of an internal conflict rather than an all-out external invasion. Once the mainstream of the urban order was destroyed, with the underlying incentives and organization gone and restraints removed, what might have reigned would be the law of the countryside. We have thus a situation in which a rural order might well have superimposed itself over the urban debris and, hence, the late phase of the Indus Civilization is considered to be a phase of decadence when the output of urban virtues had all but totally ceased. The structures lost their alignment, bricks were pillaged and re-used and the sense of economic direction had degenerated into dilapidation. Dani (1967) has concluded with insight: 'The moving spirit of the Civilization lay in the set-up of the cities which exploited the villages. Once the main life was destroyed what was left was only a rural scene in stark backwardness.'

REFERENCES

Dani, A.H. 1967. Excavations in the Gomal Valley. *Ancient Pakistan*. Vol. 3; 5.

Fairservis, W.A. Jr. 1966. Problems in Post-Harappan Archaeology in the Lower Indus Valley and Baluchistan. *Journal M.S. University Baroda*. Vol. 15, 1; 25-36.

Joshi, J.P. 1974. The Nature of Settlement at Surkotada, District Kutch (Gujarat). Paper read at the *Prehistory Seminar 1974*. Poona (Unpublished).

Rao, S.R. 1973. *Lothal and the Indus Civilization*. Bombay.

Sankalia, H.D. 1973. Prehistoric Colonization in India. *World Archaeology*. Vol. 5, 1.

Thapar, B.K. 1973. New Traits of the Indus Civilization at Kalibangan: An Appraisal. In *South Asian Archaeology* Norman Hammond ed. New Jersey. 85-104.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

25

K.V. Soundararajan

Kutch Harappan – A Corridor of the Indus Phase

The Indus delta is a continuation of the *khadar* or older alluvium, dating back to the Pleistocene. Within historical times, the Indus had a much easterly course and discharged its waters at first into the Gulf of Cambay and then into the Rann of Kutch (Taylor-Griffith 1953). A branch of the Indus, the Nara, joined the Rann of Kutch, before the earthquake of 1833. Both in Sind and in Kutch, there exist popular traditions as well as physical evidence, to support the inference that the Indus has substantially changed its course during historical times, towards a more westerly

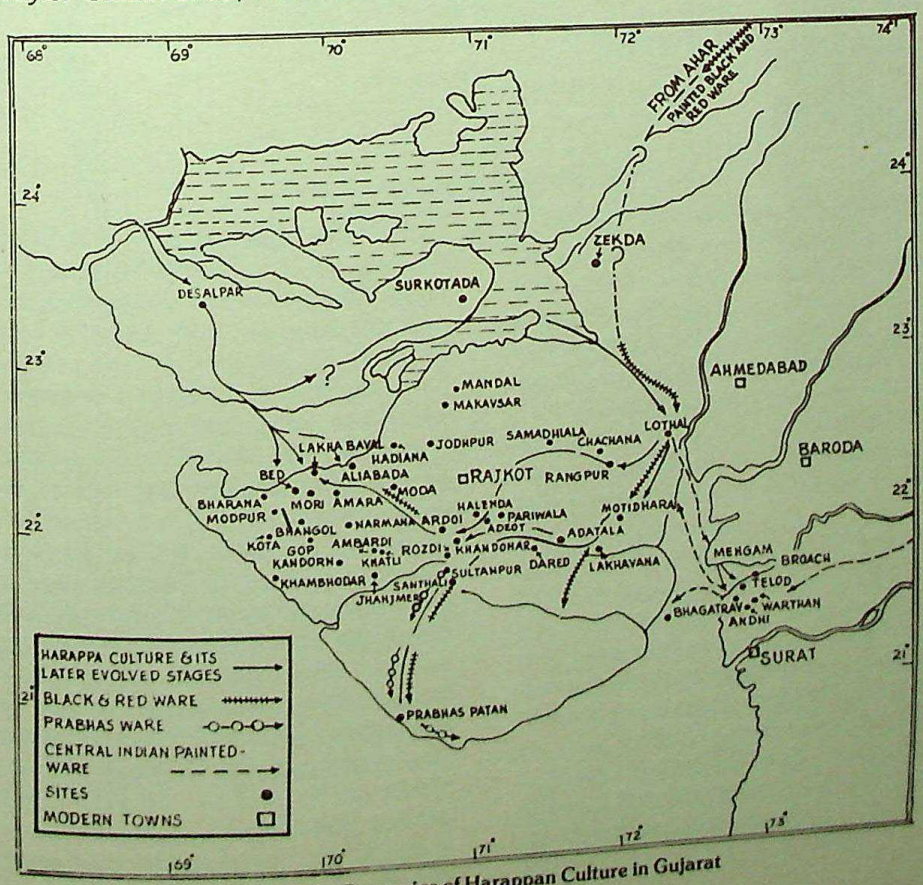


Fig.25.1. Dynamics of Harappan Culture in Gujarat

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

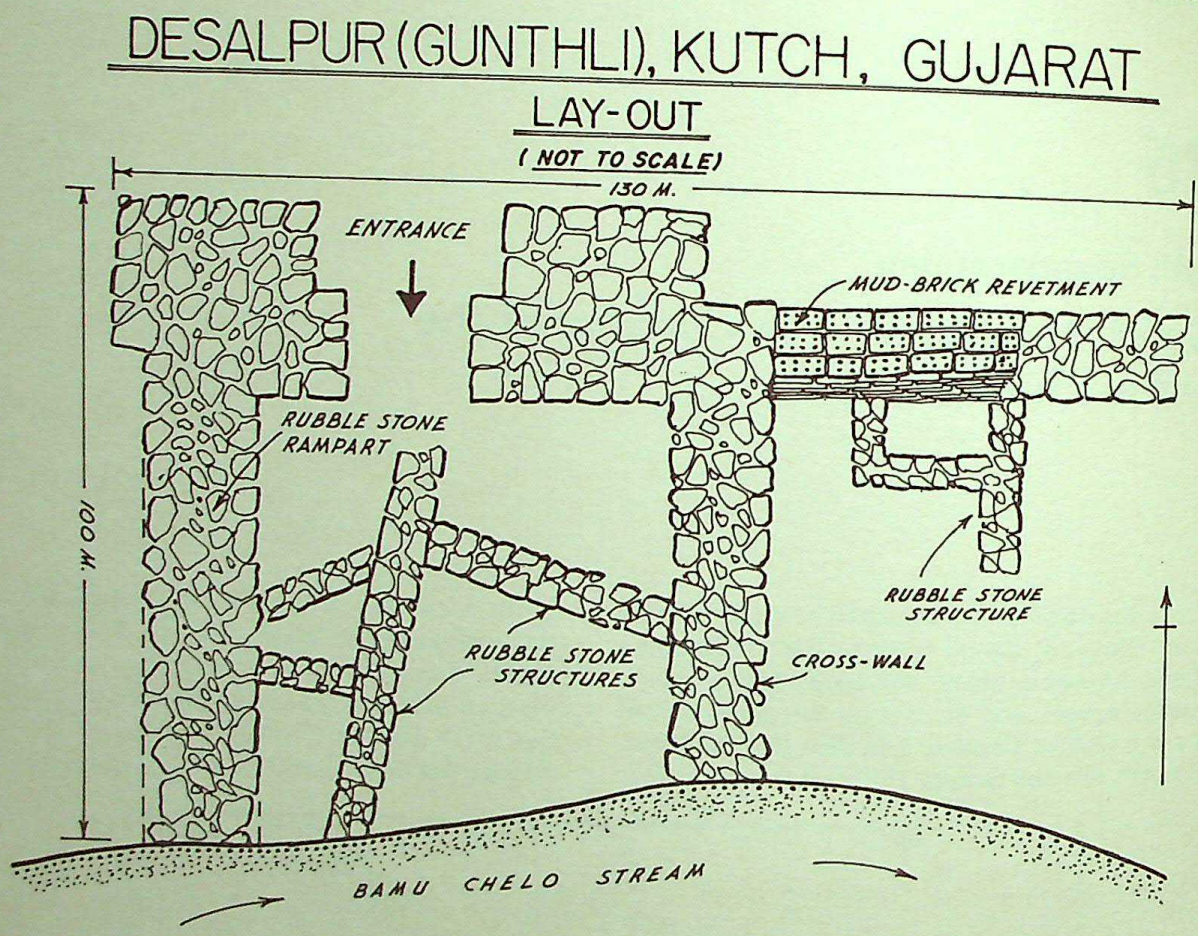


Fig.25.2. Desalpur: Structures in plan

one. The Gulf of Kutch was once an inlet of the Arabian sea and has now been silted up by the detritus poured into it by rivers flowing from east to north-east. This is why in winter (November to March) during the regime of the north-eastern monsoon, the Rann presents a salt-encrusted desolate mud-flat, enlivened only occasionally by a passing camel caravan or wild asses, but during the other half of the year, is flooded with water that is held back mainly by the ebbing sea, due to monsoon gales.

The physiomorphological compulsions **(fig. 25.1)**, of this part of the country suggest its being ancillary to an epicentre of civilization, involving the grading of the Indus culture into sub-Indus categories, owing to its distance from the nucleating zones of the civilization. Its greater nearness, however, to the lower Indus cultural zone of Mohenjo-daro and Kot Diji, than even to Saurashtra makes it a type region and a key to the processes afoot in the devolutions of both the lower Indus cities and those of Gujarat-Saurashtra. Fairservis went to the extent of considering the phase-range of certain sites of the Indus Civilization and taking Desalpur as a seaport contemporary with Lothal A and indicative of the sustenance of the sea-connections between Sind and Gujarat. Between Desalpur, which was the first definitive excavation of Kutch-Harappan, and Surkotada, a relatively larger site of the same category but located towards the eastern extremity of Kutch, about 12 km to the north-east of Adesar (unlike Desalpur which is towards the north-western part of Kutch, comparatively nearer at hand to Mohenjo-daro in Sind), the characteristics of the Harappan occupational culture get well etched. The ^{14}C dating for Surkotada yield an effective time-bracket of *c.* 2100-1700 B.C., which was primarily assessed stratigraphically for Desalpur also in its earlier report (*IAR 1963-64*, 10-12). The latter site, eroded substantially as it was by the stream Bamu Chelo, could not reveal the entire layout **(fig. 25.2)** as effectively as Surkotada did.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FEATURES

The specific features of the Harappan contexts at these two sites may, in the first instance, be outlined at this stage.

1. A compact citadel or fortified complex has been excavated at both places, together with a residential sub-part thereof more fully preserved at Surkotada **(fig. 25.3)**, but though the latter excavation considers a part of the citadel as the living area, there is no city-complex as such in either of the two. This, together with their specific location at two diametrically opposite parts of Kutch, would warrant a surmise that these two stations were essentially trade-cum-political or administrative outposts or garrisons of the central Harappan authority. In this respect, they are of a category similar to Sutkagendor on the Baluchi coast of the Arabian sea. The rectangular pattern of the fortification-complex at both places is also worth noting.

2. The citadel-complex continued in use throughout the two main cultural stages, viz. IA & IB **(fig. 25.4)**, and it was only during the interval between these and the early historical period that its functional use faded away from memory **(fig. 25.5)**.

3. Rubble as well as partly chiselled stones 80
were employed in the construction of the rampart which itself was wide, massive and of regular elevation.

4. Non-Harappan ceramic culture and absence of the Mother Goddess cult are common to both sites. Of the former it may be said that the 'reserved slip' Ware **(fig. 25.6/6-10)**, found at the very lowest stratum coeval with the Harappan and common to Desalpur and Surkotada had been found at Lothal A Phase II, Somnath IB, and outside India in Sargonid levels at Brak, in the Khabur valley, Akkad, Ur, Kish and Nineveh in West Asia, and also at Mohenjo-daro, in levels favouring a horizon around 2371 — 2316 B.C. for the lowest occurrences. While certainly a slightly posterior time bracket may be relevant for Kutch, it may still be emphasised that this ceramic is essentially a traderesidue of its resident users in operational movements to and fro.

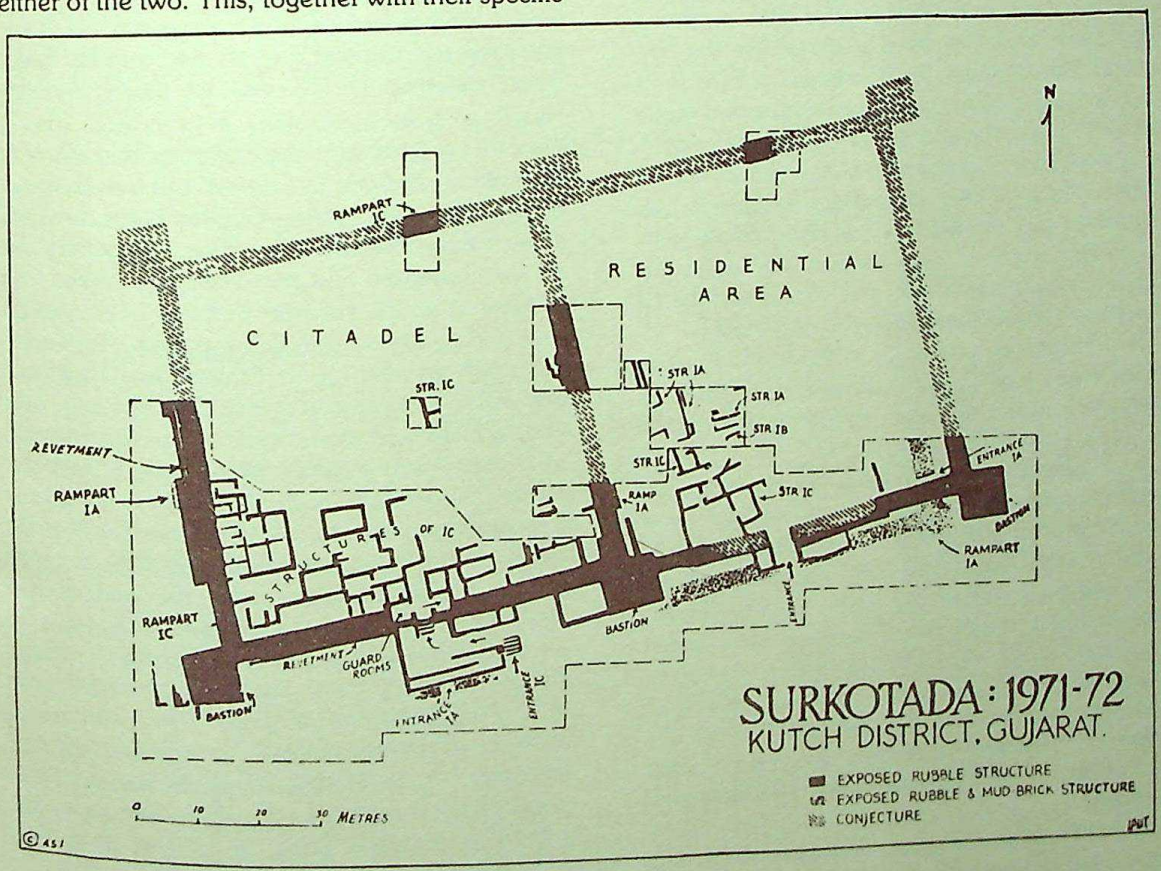


Fig.25.3. Surkotada: Structures in plan

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Besides this, there was also the deep red, burnt amber-slipped red ware with a waxy feel which occurs at Desalpur and Surkotada but does not appear to have any external parallels in this period and may well be a locally manufactured ceramic category which is liable to be labelled truly as a Kutch-Harappan ancillary. It is not clear if it represents the influx of some new authors of it at this place. The polychrome red ware, the polytone cream-slipped ware **(fig. 25.6/15-21)**, are all exotic and may show links with Amri, Bampur, Siah II levels of Kalat and southern Turkmenia and may be due either like the 'reserved slipped ware', to movement of folks who had used them elsewhere, or to local adaptations thereof. The polychrome ware, particularly used in low-necked round-bodied jars and bowls of differing sizes, with geometric designs in its repertoire **(fig. 25.6/17-25)**, is comparable with Kechi Beg white or dark reddish slip ware, the Jangal polychrome ware, and even Fabric A of pre-Harappan Kalibangan and Sarai Khola II.

5. Mud-bricks, seemingly in the form of heart-ing as they occur on the inner side of the rampart were noticed in both sites, though not conclusi-vely or consistently in all stretches.

6. Period IB has a red ware, potted on a slow wheel, comprising bowls with a straight or a convex profile, while in IC, white painted black-and-red ware occurs in bulk, accounting for a little less than half of the entire pottery. Short-stud-handled bowls in micaceous ware (seen mostly at Lothal, etc. in Saurashtra) and strap or channel-handled bowls are again suggestive of links between Kutch and Saurashtra, though in a lower key. But white painted black-and-red ware can claim an earlier provenance at Lothal and Rangpur.

7. While both Desalpur and Surkotada, and indeed other sites explored in Kutch, have not so far yielded the Lustrous Red Ware, it is the hall-mark of the later cultures in Saurashtra, e.g. in Lothal B, Rangpur IIB and C, Prabhas II, Lakha-bawal II, etc. However, Zekada in Banaskantha District, which is hardly 45 km across the desert to the east of Surkotada, has yielded the Lustrous Red Ware during the course of explorations. Painted black-and-red ware was also found at this site. This is somewhat interesting since this would mean that the Lustrous Red Ware at Zekada could not have been earlier than IB of Kutch Harappan at Desalpur and Surkotada, for otherwise it could also have been found in Kutch proper. Zekada had also yielded the 'reserved slip' pottery, thereby indicating that for its basal cultural stage, it had coevality with Kutch proper, but somewhere, after Phase IB of Desalpur and Surkotada, mainland Kutch had become totally inaccessible from both Saurashtra and mainland Gujarat, resulting from links being snapped which were restored only in early historical times, as suggested, for example, by the presence at De-salpur of the 'Vasai Ware' of Saurashtra. This would indeed also explain the stage at which the Harappan at Gujarat had shaded into the post-Indus because of the lack of touch, through Kutch, with Mohenjo-daro, etc., in Sind. This is also the reason why the Lustrous Red Ware is essentially confined to Gujarat and tries to move feebly eastwards outside Gujarat, but is met with other Central Indian wares. The only pottery out of the Harappan and non-Harappan mixed bag in Gujarat which assumes mobility both towards east and towards north is the painted black-and-red ware, as seen up to Prakash and Navdatoli and Ahar variously. It is not clear if Kutch was getting more and more dessicated or was covered with water and swamp. More likely it was the former, since the semi-desert situation of western Rajasthan and the NE — SW strike of the Aravalli chain on the outer wing had indeed been more and more inhospitable since the end of the Harappan. This perhaps explains why, alike in north Gujarat and Kutch after IB phase, village life gets virtually decimated and is revived only during the early historic times. The buffer status of Kutch in the transmission, though not in trans-mutation, of the Mature Harappan and contem-porary links from sind or the Indus estuary to the coastal and inland areas of Gujarat (including Saurashtra) is apparent in this.

8. In Saurashtra, it has been held that Phases IIA, IIB and IIC of Rangpur, though separated, have a bulk of equipment which is still affiliated to the Harappan culture, though with 'the absence of the perforated jar, goblet, jar with micacious red slip and terracotta triangular cakes, the culmi-nation of the process of gradual replacement of certain old forms by newly evolved forms' has taken place (Rao 1962-63). The above view, quoted from the excavation report, makes it clear that the excavator presumes that the process of replacement had already set in earlier, perhaps in IIB itself, and is only culminating by IIC and III

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

(Period of the Lustrous Red Ware) and this seems to have been caused on account of isolation. If so, the dating of the Harappan culture from 2000 B.C. up to 1000 B.C. as indicated by Rao, the excavator of Rangpur, (Rao 1962-63), may not be justified. Even his IIB stage, on account of the coarseness and indifference of pottery, absence of any structures (though floor-vestiges have been available), absence of drains, baths, etc. and the presence of post-holes (perhaps for thatched structures), cannot truly be labled Harappan. In fact, the IIB to IIC stage is truly degenerate rather than Late Harappan. A corresponding ^{14}C date for the Lustrous Red Ware at Navdatoli (Phase IV) is *c.* 1500 - 1700 B.C.; and *c.* 1500 B.C. would truly reflect the virtual end of the Harappan all over this region, if it was not a little earlier. A graphic picture of this degradation at Rangpur IIB is vouched for by the very meagre number of steatite faience beads (five each), as compared to 4916 of the former and 73 of the latter in Phase IIA. Again, Ahar I and Rangpur IIC and III are taken as contemporaries by the presence of the Lustrous Red Ware. This would suggest that the closing stages of Desalpur IB and Surkotada IB should be datable around *c.* 1500 B.C.—a date that would be appropriate for Ahar I, with the understanding

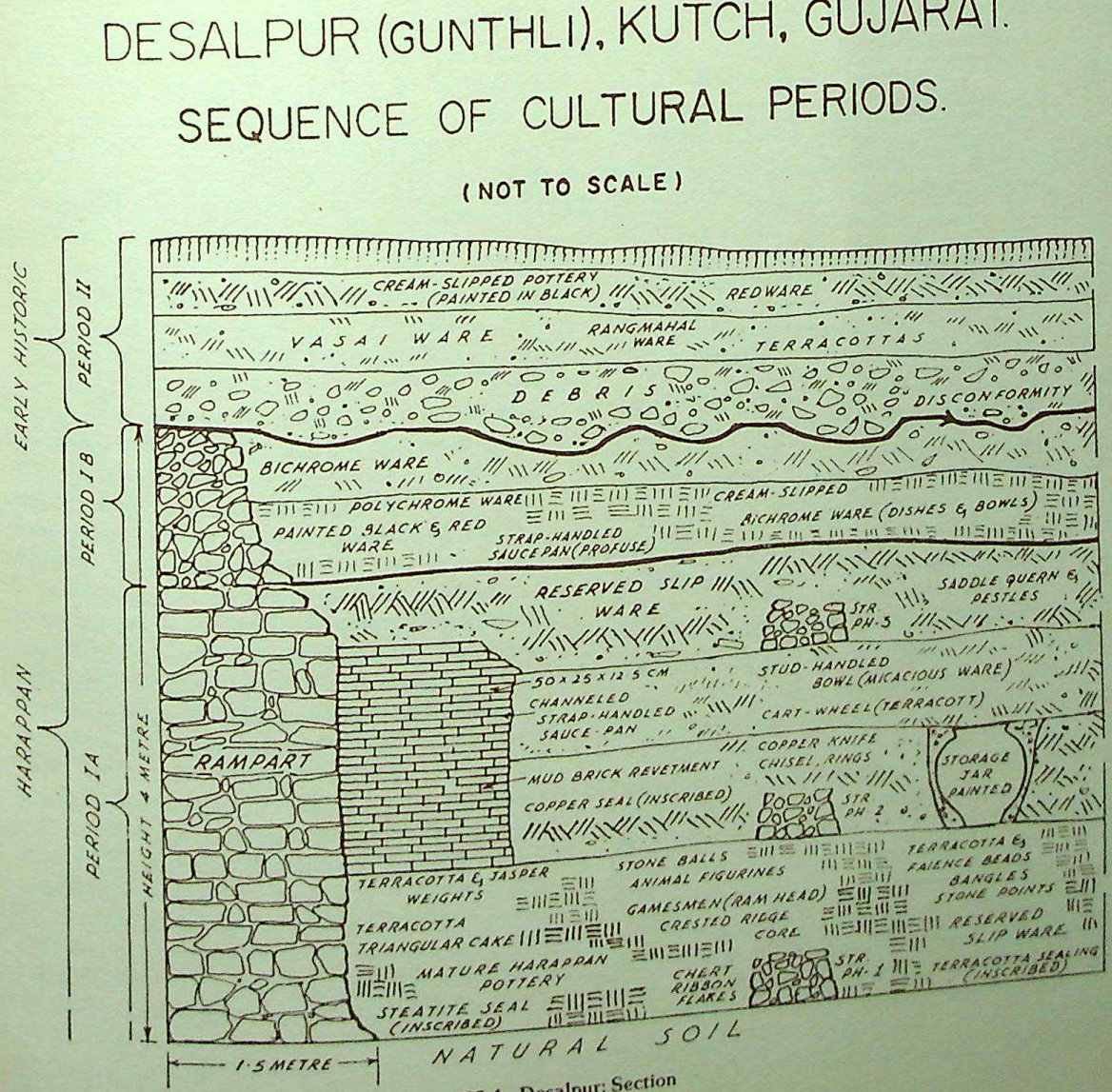


Fig.25.4. Desalpur: Section

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

that at that stage, Ahar and Kutch sites had become mutually inaccessible.

9. The occurrence of a burial site at Surkotada is indeed interesting. (Corresponding evidence at Desalpur was seemingly destroyed by the stream there in the past). The graves consisted of pits with pots containing post-cremation vestiges of bones. The top of the pits was often covered with a slab overlain with cairn (**fig. 25.7**). Such post-cremation pot-burials have been noticed at Periano Ghundai, Moghul Ghundai, Dabarkot, Sutkagendor, Kulli, Mehi, Nal and Shahi Tump, and constitute the only major uniformly prevalent type of burial, all other types being less uniformly represented at these sites in the period concerned. This is considered as an example of variability of burial traits *within one and the same* complex when it occurs in the Harappan complex, as at Surkotada. But there is certainly more in it than meets the eye. It should clearly suggest that there is an admixture of both pre-Harappan as well as Harappan elements in the entire culture—culturally but not chronologically—which will show that a polyglot community had been living here, drawn to this place during the Harappan times mainly because of trade and administration. If this presumption is correct, then one would think that the burial site at Surkotada deserves to be *fully* excavated to have a percentage count of the *ethnic* variety in it, which may show startlingly new data on this aspect, separating such sites from the truly Harappan *habitation sites*. The implication of this view is that sites like Desalpur and Surkotada are not typical Harappan village or town sites, but more in the category of depots or cantonments or outposts where no regular village community exists but only men on duty with a specific role to fulfil and thus its cultural level will be not only fairly uniform temporally, but varied compositionally. Any village site in Kutch of that age, on the other hand, if available, will give a substratum culture, different from these special outposts. Hence, by their very category of functional orientation, Kutch sites form a class by themselves among Harappan sites, and do *not* form true-to-type, dyed-in-the-wool, Harappan assemblages, but only of and for the Harappan empire.

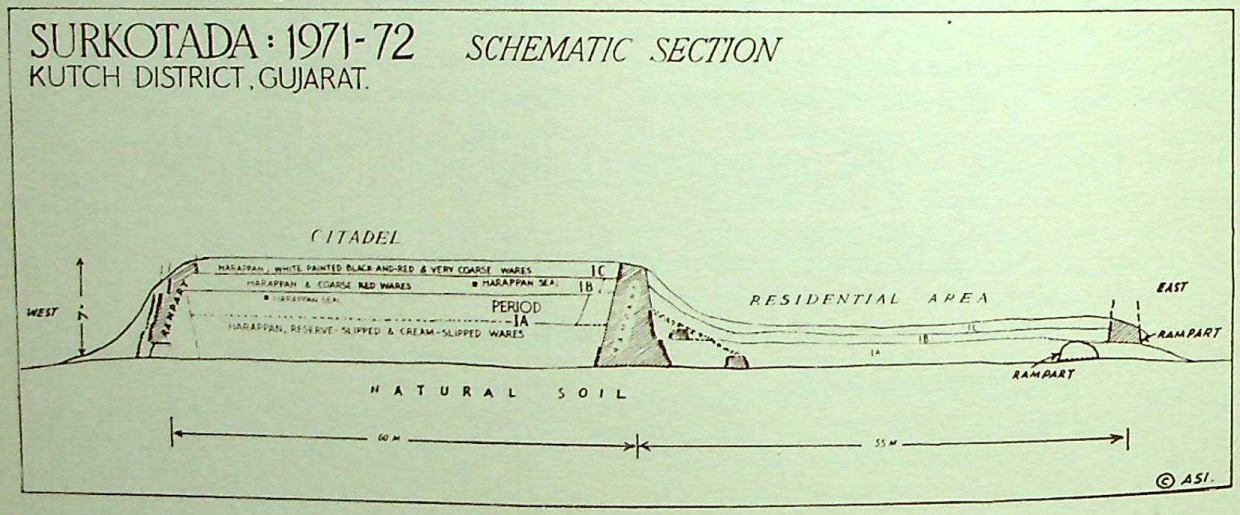


Fig.25.5. Surkotada: Schematic section

10. It can be seen that the entire series of sites like Sutkagendor, Ghazi Shah, Kot Diji, Judeiro-daro and even probably Dabarkot, besides Kalibangan further to the east, do not seem to have any *late* phase at all of the Harappa Culture, while sites like Jhukar, Chanhu-daro, Desalpur and Surkotada in Kutch and Rangpur and Lothal in Saurashtra do have a truly Late Harappan phase, besides only a comparatively limited mature phase of varying degrees. The other more easterly sites like Ropar, Alamgirpur, Bhagwanpura, etc. show clearly and exclusively a *non-Harappan milieu*, in the period corresponding to the Late Phases of the Harappan and have only a *late* stage of Mature Harappan to start the site. This brings into operation the centripetal processes in the pre-Harappan foundational stage, and a *centrifugal* process (eastwards only) in the Late and post-Harappan stages. It also provides evidence for the 'central place theory' of Fairservis (Fairservis 1971), by which, for every

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

set of mature Harappan sites, there will have to be a major site of the pre- or antecedent Harappan stage. Mohenjo-daro for Sind, Harappa for Western Punjab, Kalibangan for northern Rajasthan, Banawali for eastern Punjab seem indeed to be examples of these, and have thus a space-time coordination for the stamina and line of diffusion of the mature Harappan stage of the civilization.

In the case of the Saurashtra-Kutch series, we do not have any truly antecedent culture site; we have the mature Harappan to start with, with an accompanying non-Harappan coeval culture like the 'reserved slip ware' culture for Kutch and the painted black-and-red ware culture for Saurashtra. While Saurashtra and mainland Gujarat Harappan have the degenerate Harappan stage and a post-Harappan denouement, in the form of the Lustrous Red Ware, Kutch sites have a further fresh, *non-Harappan* stage and do not show any post-Harappan devolution, the occupation ceasing abruptly, as at IB of Desalpur and IB-IC of Surkotada. The reason for the ceasing of the Harappan stage in Kutch may be partly geographical and partly climatic but surely not cultural and occupational. The Sind delta may itself have silted up, snapping direct links with the Harappan 'central' power there. We have already stated how the dessication of the area, after Period IB, may account for the difference in constituent cultures between the Kutch sites on the one hand and Zekada on the other. This would underscore a physiomorphic and climatic change that ordered the recession of the area from the *main line* of communication of cultural trends, even for contiguous areas like Kutch and mainland Gujarat (Banaskantha District), and highlight the dichotomy of the Gujarat-Saurashtra Harappan itself with the Kutch Harappan in particular. In the process, the link of the region with the primary source of diffusion, namely the lower Indus valley sites like Mohenjo-daro, etc. also dried up. Trade and other maritime dimensions of this sub-Indus cultural region of Gujarat-Saurashtra also got variegated, diversified and transmuted in this context. The essentially gulf-and-insular character of Kutch was thus cut asunder indicating that there was no special beaten *coastal sea route directly* from the Indus estuary around the Saurashtra land mass, to the Gulf of Cambay at this stage of transformation, to enliven and catalyse the de-linked Harappan movement. We do not see, anywhere around the Saurashtra coast, virtually upto the Gulf of Cambay, any early or mature Harappan site, but a large number of late Harappan sites. This indicates the pattern of diffusion of the Harappan in Saurashtra, which for this purpose is a zone by itself, different from that of the mainland and of Gujarat. Further, while in the mature Harappan period, with land and insular routes through Kutch assured between lower Sind and Gujarat-Saurashtra, there had been a reasonably coeval pattern of culture-components, the snapping of the link makes these primary Harappan centres in Saurashtra fan out along the coast, as the central part of Saurashtra is an upland without morphological advantages, except for Rozdi on the Bhadar assuring a link with the Arabian sea. Correspondingly, in the mainland Harappan, the presence of other regional forces is even more apparent, through a transformation of the Harappan into the Lustrous Red Ware denouement, as a viable local entity and the black-and-red ware interaction with the Banas valley are notable. Thus, Kutch, on the one hand, and the strident spine of the Aravallis, on the other, greatly influenced the development of cultural and urban trends in Gujarat and Saurashtra. The fact is that intrusion of the 'reserved slip' pottery, *not* seen at all in Saurashtra except at Lothal, created, all in all, a culturally 'endogamous' pattern for Saurashtra, to borrow an ethno-sociological term. Further, instead of there being a cultural *atrophy*, a *regeneration* of the area was triggered off through the Lustrous Red Ware which permeates into the Narmada-Tapi zone also.

Transport and Colonization Trends

There is no finite evidence of colonization or even minor ports of call of the mature Harappan as explained earlier, except at Lothal and Rangpur. The wholly impracticable chance of a boat leaving a port of northern Kutch (much less from the Sind eastuary direct) with men and merchandize from Sind, or on its own, to have its sails fully aloft for a marathon journey upto Lothal *by sea* without disembarking even once for refuelling or for other contingencies until it reaches the Gulf of Cambay, is also to be appreciated. This explains how Kutch was as much a *middle man's zone* between Sind and Gujarat as, on a more spectacular and comprehensive scale, the Gulf islands in the Persian Gulf, like Bahrain, etc.,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

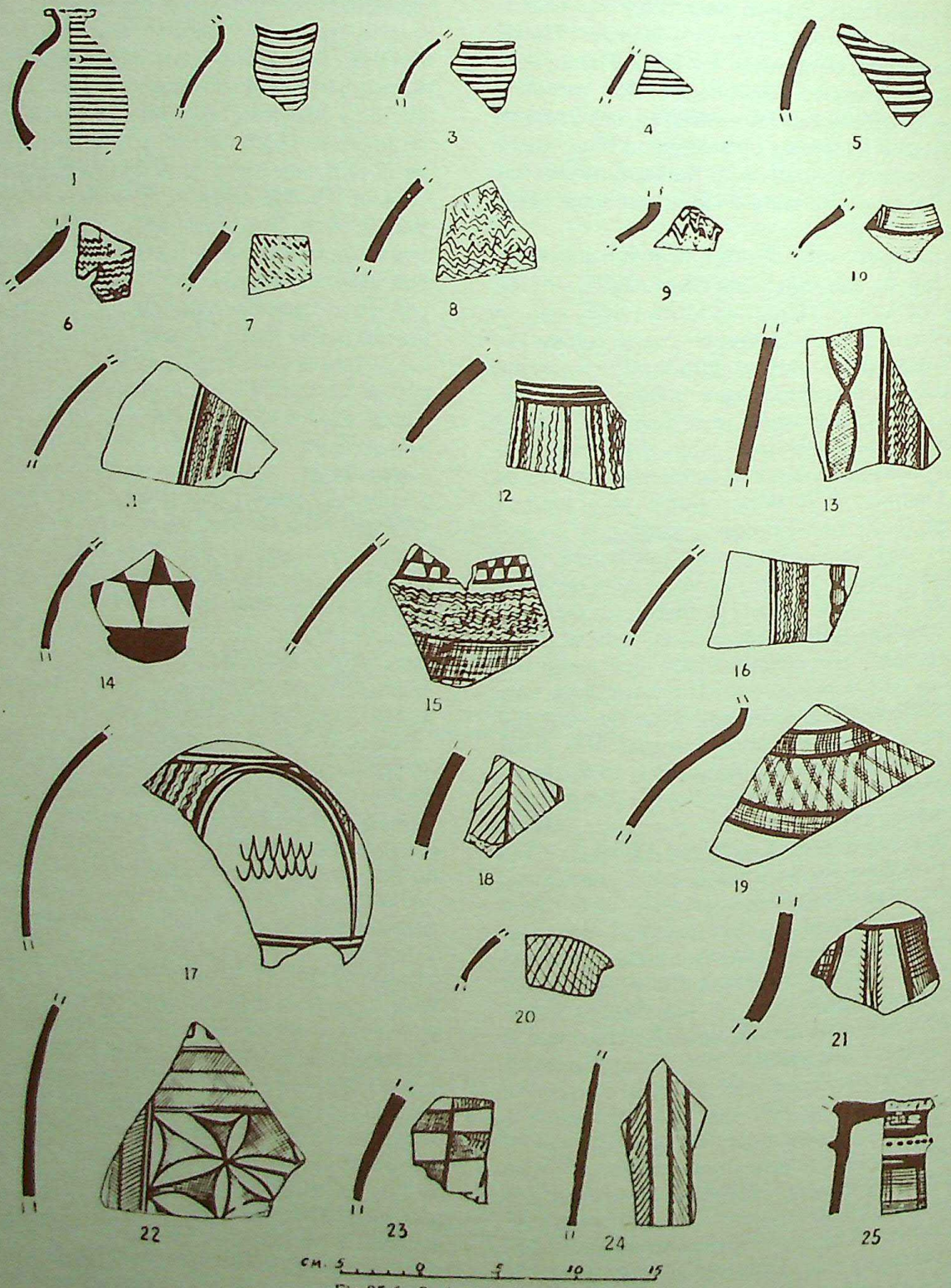


Fig.25.6. Surkotada: Pottery of Period IA

were middle-man stages between the Indus Civilization as a whole, and western Asia, on the maritime plane. Thus, there was a *Kutch-Cambay corridor*, with land and sea transhipments, and this got silted up and desiccated owing to the combined effects of the high tides of the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Arabian sea and the estuarine spread of the area immediately to the east of the Sabarmati river (on whose coastal flats Lothal is located), drawing the waters of the Sabarmati into its own estuarine network by linking it. The absence of the 'reserved slip' at Rangpur would have made Saurashtra and Kutch alike a *backyard,* with alternatively cohesive and/or divisive roles in the receipt and dissemination of the Harappan culture impulses.

The Mature Harappan in the Kutch sites themselves, had a limited life and affected the goings-on in Gujarat and Saurashtra also, after the high point of Lothal. Period IIA of Rangpur shows the onset of the late phase of Mature Harappan, and post-Mature Harappan is clearly extended into IIB and IIC. Period IIB is already datable to 1995 B.C. ± 125 (TF-26). The 'dockyard' of Lothal is a structure considered by the excavator as built in Phase II of Lothal and

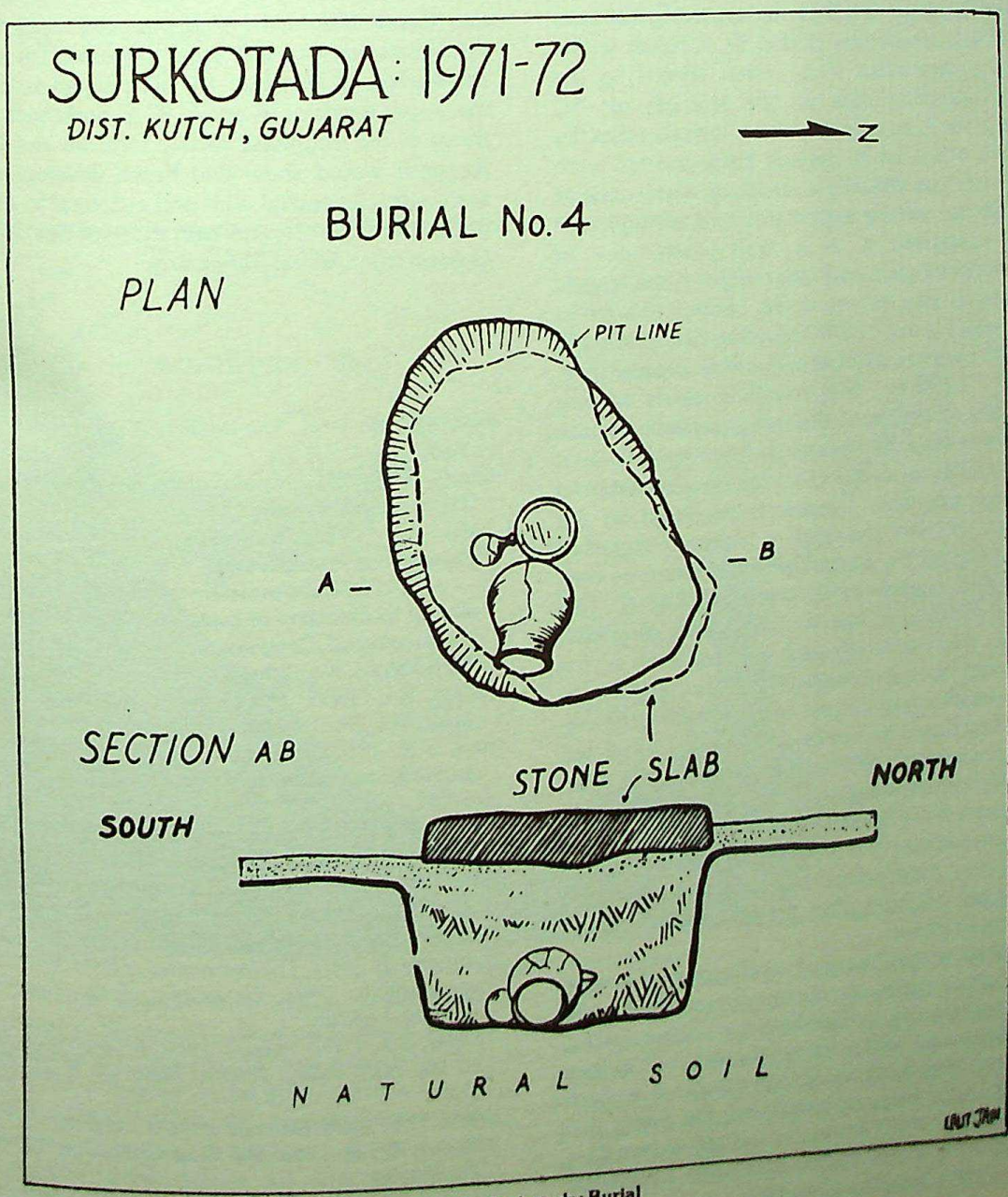


Fig.25.7. Surkotada: Burial

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

continuing into Phase III and even IV, by which time, it is to be taken (according to TF-19) that it had fallen into disuse around *c.* 1800 B.C. On the basis of a comparison between Navdatoli Lustrous Red Ware and that of Rangpur, the advent of that ware in the former place would be *c.* 1500 B.C., thus making the end of Lothal A virtually the starting point of the Lustrous Red Ware. The evidence of the disuse of the 'dockyard' seems to fit in well with the end of Period IA of Kutch Harappan at Desalpur and Surkotada, placing it around 1800 B.C. whereafter period IB of Kutch would have commenced. This, when related to the lowest possible date on the strength of ^{14}C datings for Ahar as *c.* 1800 B.C. indicates that the advent of the white painted black-and-red ware in Kutch was virtually a *streak of dominance* of the Banas culture ingredients and communities that supported it at a time when, due to geomorphological and other reasons, the Mature Harappan was, in any event, coming to a close. This ware, though early at Lothal, does not come into its own in areas before outside Saurashtra *c.* 1800 - 1700 B.C. We may thus, safely surmise that the *epicentre* of this painted black-and-red ware was *truly* the Saurashtra (mainland) Gujarat zone and its movement into the Banas valley was through mainland Gujarat, consequent on the decay of the Harappan culture, signalled especially by the cessation of the maritime contacts and commerce in ports like Lothal. This was, thus, truly an era of change, shift, new affiliations, fresh contacts and transmutation of the decaying Harappan legacy into another garb (as in Saurashtra). In this process, therefore, the evidence of Kutch serves as an effective barometer, symptomatic of the stages of development these regions were undergoing. Thus, Kutch Harappan sites served like Sutkagendor and Sotka-koh, as a link-relationship and an *infrastructure* for Mature Harappan motivations in the areas concerned and were blighted after the end of the mature Harappan phase.

82 In their employment of all elements of Harap-
81A pan culture (with, of course, several non-Harap-
81B pan ingredients), in their having a copper sealing, a steatite seal and a terracotta seal, but in their having heavy fortification with the absence of any viable outer town or habitation, the Kutch sites betray their *trade-transport -administrative bias*, in relation to the central Harappan hegemony. Thus Kutch was, in effect, only a *trading corridor* and not a zone of effective colonization (as was Gujarat, typified at Lothal) and had a functional slant. We have already suggested the possible synchronism among Rangpur IIC, Kutch Harappan IB and Navdatoli IV, with *terminus-post quem of c.* 1500 B.C., giving a like date for the end of Kutch Harappan IB (and IC) while its beginning on the basis of availability of an engraved Harappan script even earlier, especially at Rangpur IIb fits plausibly *with c. 1800 B.C. dates, when the direct link with Sind snapped and local developments and drift were triggered.* The copper sealing of Desalpur IA, the painted script of the upper levels of IA and in IC at Surkotada and those of the engraved variety form IIb and C of Rangpur would show that Kutch developments were virtually coeval with and collateral to those of Sind in Peiod IA and with those of Saurashtra Gujarat from period IB onwards.

REFERENCES

Fairservis, W. 1971. *The Roots of Ancient India.* New York.

Gupta, S.P. 1974. *Disposal of the Dead and Physical Types in Ancient India.* Delhi.

Joshi, J.P. 1974. Surkotada — A Chronological Assessment. *Puratattva.* No. 7; 34-38.

———. 1976. Transformation of Harappa Culture in Kutch: Examination of Evidence from Surkotada. In *Archaeological Congress and Seminar 1972;* Udai Vir Singh ed. Kurukshetra.

Raikes, R.L. 1965. The Mohenjo-daro Floods. *Antiquity.* Vol. 39; Cambridge. 196-203.

Rao, S.R. 1963. Excavation at Rangpur and other explorations in Gujarat. *Ancient India.* Nos. 18 & 19; 5-207.

Richards, F.J. 1933. Geographical factors in Indian Archaeology. *Indian Antiquary.* Vol. 62. London.

Soundara Rajan, K.V. 1967. Excavation at Desalpur (Gunthli), District Kutch. *Indian Archaeology 1963-64 — A Review.* New Delhi.

Subbarao, B. 1958. *The Personality of India.* Baroda.

Taylor-Griffith. 1953. *Geography in the Twentieth century.* London.

Thapar, B.K. 1967. Prakash 1955: A Chalcolithic Site in the Tapti Valley. *Ancient India.* 20 & 21. New Delhi.

Wadia, D.N. 1926. *Geology of India.* London.

Wheeler, R.E.M. 1968. *The Indus Civilization.* 129-34. Cambridge.

Wynne, A.B. 1872. *Geology of Kutch.* Memoirs of the Geological Survey of india. Vol. 9; pt. 1.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

26

R.N. Mehta

Valabhi – A Station of Harappan Cattle-breeders

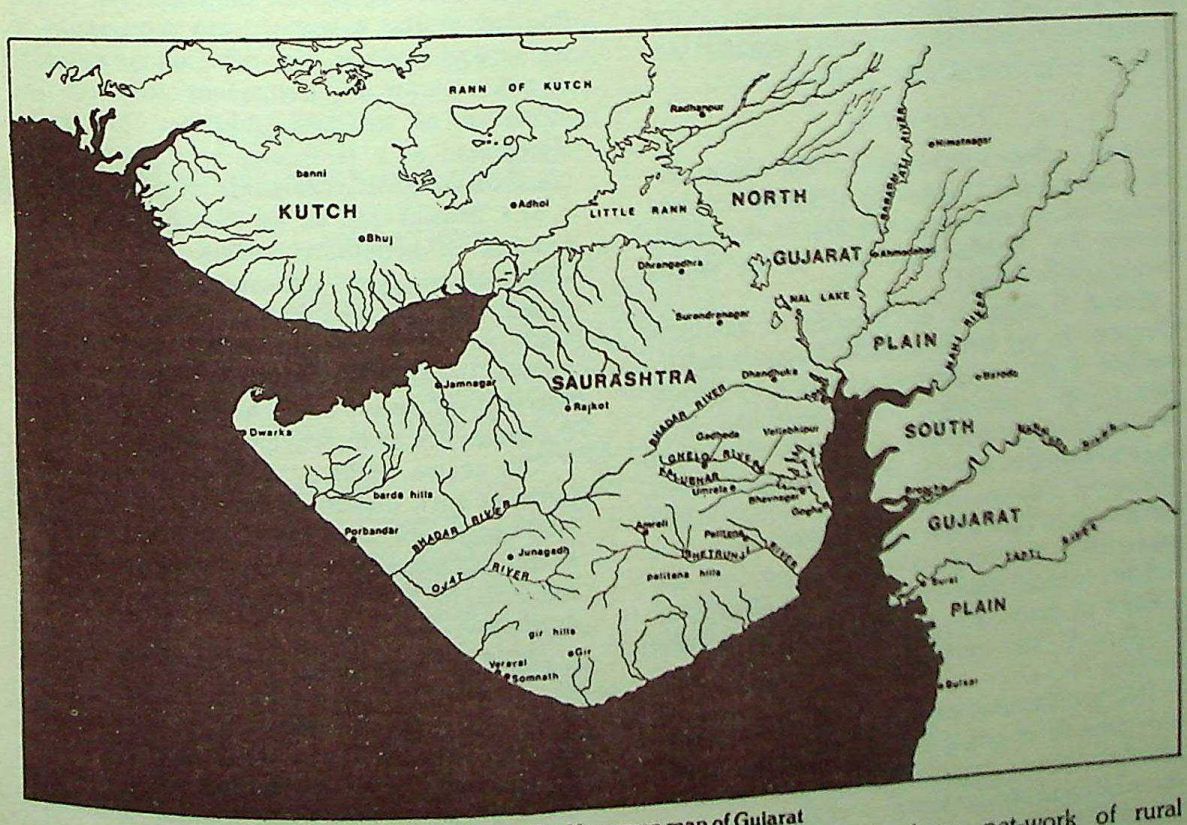


Fig.26.1. The Harappan map of Gujarat

The Harappa culture of the Indian subcontinent flourished in different kinds of settlements. Many of them are tiny, covering a very small area, not more than a quarter of an acre, while a few of them are large settlements, covering more than 200 acres. However, in our zeal to study the urban aspects of this culture, we have gone to the sites of the latter category and not paid sufficient attention to small settlements. It is essential to note that unless a large net-work of rural economic base was there, culture in the past did not advance to develop large commercial centres. It is this largely neglected aspect of Harappan culture which is being probed here through the excavations of a really very small site at Valabhi in Gujarat.

While exploring and excavating in western India, the existence of small habitats, which had

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Harappan ceramics, and even graffiti of Harappan script, in and around circular *Kubas*, were identified. The terracotta triangular cakes, round balls, *mushtis*, (oblong cakes with finger marks) and other typical materials indicated that these habitats had strong Harappan elements in them. Their size, place of location, cultural contents, etc. differentiated these settlements from large urban sites.

These settlements, indicated by small shallow mounds, were situated in such geographical areas which were slightly away from the active flood plains.

Recent explorations and excavations show still another type of situation at Nesadi, near Valabhi, since the sites here are flooded in the monsoon. Obviously, these were only seasonal camps. To our mind, many of the tiny sites located in the Ghagghar Valley of the Bahawalpur region (Mughal 1980) also belong to this category.

Field Work

Valabhi, a taluka headquarter in Bhavnagar district, Gujarat, was a capital city of the Maitrakas of western India from about the fifth to the eighth century A.D. It was excavated by us during February-April, 1980.

Nesadi is situated at distance of about a kilometre to the south-west of the present Valabhipur. It can be approached either by a footpath or by a cart-track from Valabhipur. The mound is so low that one can easily miss it but local information is so clear that it is not difficult to locate it. The site covers an area of 200 × 200 metres. From here a few small streams move to a major river, the Ghelo. While coming from the Valabhi-Amareli road also, one has to cross small nullahs to reach this site. These small nullahs overflow in the monsoon and the area gets flooded.

This uncultivated site was an interesting area with pockets of ceramics concentrated at some spots and other areas comparatively free from ceramics and stone tools of chert, agate and basalt. During exploration, typical Harappan Buff Ware and Red Ware pots were discovered. Large jars, perforated jars and ceramics with Rangpur affinity as well as crude red ware with incised designs were also discovered.

For the purpose of excavation two small trenches, 5 × 5 metre were taken. Both of them revealed the existence of a rammed-earth floor. One of them was in a better state of preservation and it revealed the presence of a circular 83
structure. The excavations also indicated the presence of Red Ware, Buff Ware, Black-and-red 84
Ware, crude Red Ware, perforated jars and other ceramics as well as scrapers of basalt and 85
terracotta bulls.

The osteological remains indicated the presence of cows and deer.

Here the mud structure, noted above, was raised on primary black soil below which was disintegrated rock. The archaeological deposit here was very thin. The excavations pointed out that the natural soil was at a depth of .5 metre.

Conclusions

The location of Nesadi indicates that it gets flooded in the monsoon, but remains dry in winter and summer. This rules out the suitability of this area for any permanent settlement. The existence of structure, therefore, has to be interpreted as a temporary arrangement. Who could be the people camping here periodically?

The answer has to be discovered from the practice of temporary settlers. The non-availability of any type of weapons of war and the absence of a large habitation of this period in this area, will rule out the possibility of moving armies. The only other possible temporary migration that still occurs in this area, seems therefore, the essential explanation for this site.

This seems to be a valuable line of inquiry because such migrations of cattle breeders is a well-known phenomenon in this area. Cowherds, shepherds and camel breeders frequent this area specially in winter when sufficient fodder is available.

These cattle breeders erect temporary shelters by ramming the earth. These temporary camp sites with *kubas* are called a 'danga' by them. With some ceramics and necessities, these cattle-herders move from one *danga* to another *danga* and if the area be very rich in fodder and water, they build more permanent settlements known as *Nesa, Nesadi*.

If this practice is taken into consideration, along with the ecological situation, and the osteological contents, it satisfactorily explains the nature of this site. It seems that the cattle-breeders might have used this area around which enough fodder used to exist.

The area around Valabhi, specially in the east,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

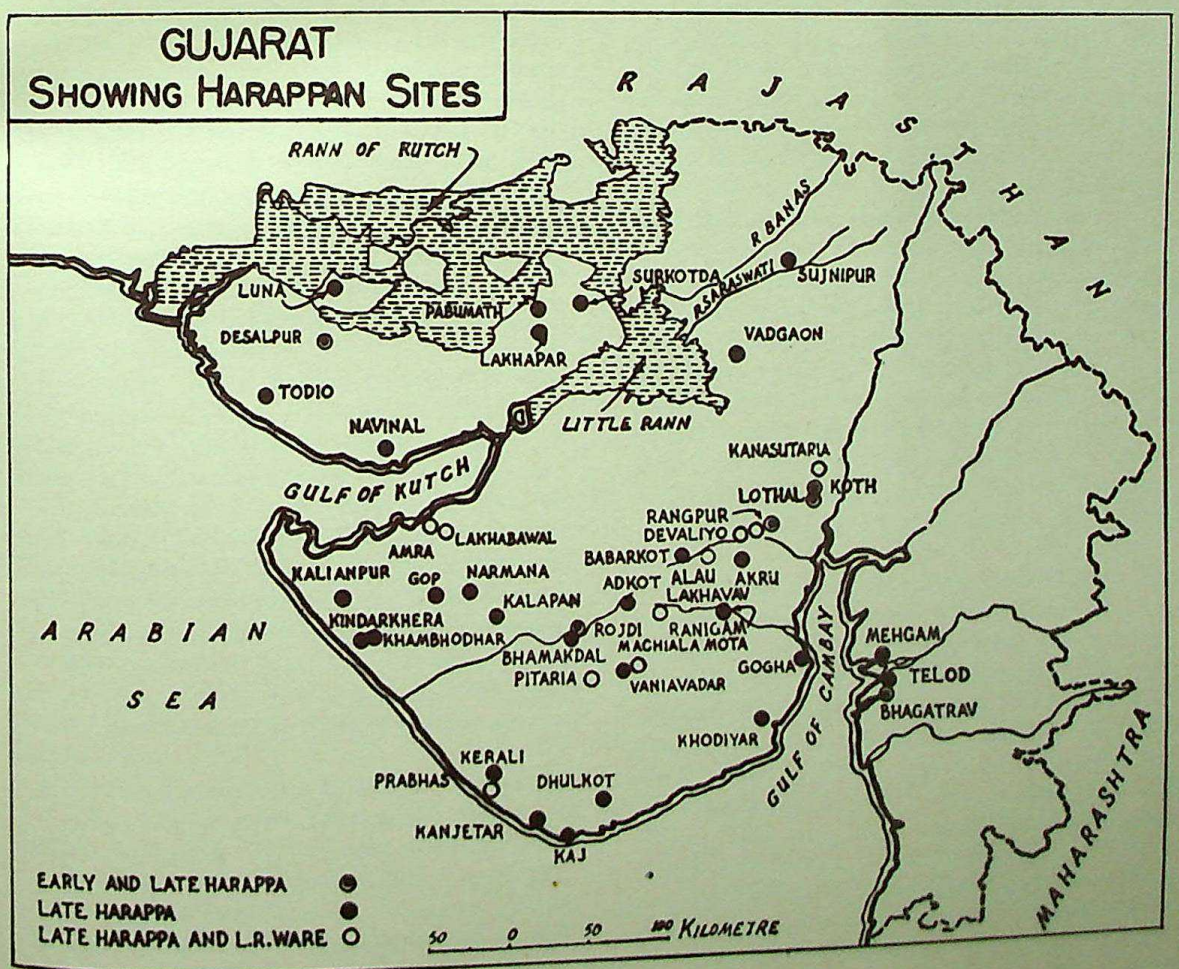
is sufficiently open to this day. Here black buck roams wild. A group of these animals was spotted by this writer in the month of March, 1980.

The black buck sanctuary of Velavadar is in the same taluka and, hence, one is justified in envisaging an open grassland with thickets (like the Gir forest) in which these settlements of cowherds might have existed.

Cowherds form a substantial portion of the present day population in this area. They practice seasonal migration by moving to different parts of western India in different seasons. This conclusion is further corroborated by the presence of animal bones.

In this migration, the cowherds return to the area where they have come before and, thus, the area is repeatedly occupied. This repetitive phenomenon would account for different places of occupation in the Nesadi locality. This phenomenon would also account for the sparse settlement where at any given time, a few cowherd families might live. This would also satisfactorily explain the differences in ceramic components at the same site.

Thus this site opens up a new direction in the understanding of the activities of cowherds of this period. It may be pointed out that the oldest traditions of Indian literature is represented by the *Rigveda*. While discussing the chronology of this complex, linguistic opinion favours its date in the second millennium B.C. or even earlier. Archaeological sites of this period are represented by Chalcolithic cultures in India. The *Rigveda* is preserved from that period down to this day. It is, therefore, reasonable to infer that some of the activities of the cowherds and their *Patsya Varijanas* might be represented by such small settlements—if contemporary phenomenon is



CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

juxtaposed and the meaning of *Patsya* as a house and *Vrijana* or *Vrija* as a grazing area are accepted. From the similarity of some pottery forms, known from Brahmavarta, and those from the region under consideration, a reasonable hypothesis, viz. that the site might represent the settlements of migrating cowherds of the late Harappan origin, can be putforth.

The discovery of terracotta bulls might support one of the elements of their worship and would thus provide interesting evidence about their religion and indicate interesting links with literature.

Further work on micro-geography and the settlement pattern of similar sites is needed to study this very important period of Indian culture.

ACKNOWLEDGEMENTS

The author acknowledges the local informants, Rahim Musani and Dharamsimha Kakadia, and his colleagues Dr. K.N. Momin, Dr. V.H. Sonawane, Dr. V.S. Parekh, Shri R.J. Khatri and Shri. N.M. Khatri for their enthusiastic support in the explorations and excavations; and Dr. (Mrs.) D.R. Shah for her efforts at identifying the bones from the excavations.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

27

K.N. Momin

Village Harappans in Kheda District of Gujarat

A scrutiny of the salient features and main characteristics of numerous Harappan sites in India and Pakistan reveal several interesting generalizations. The Harappans were attracted by favourable geographical conditions. Their civilization was not confined to small pockets. The growth of their economic activities corresponded to the growth of their settlements. This view is supported by the Harappan finds from Kheda district which is situated in the central part of Gujarat state in western India. It has an area of 7,194 square kilometres and lies between 22°-7′ and 23°-18′ north latitudes and 72°-15′ and 73°-37′ east longitudes.

The district can be divided mainly into three geographical divisions known as *Bhalbaru*, *Charotar* and *Mal*. The *Bhalbaru* (entrance to Bhal) is a low-lying area in the south-western part of the district. This is generally a flat plain of Black Cotton Soil, dotted by occasional loessic dunes of varying heights causing depressions which have become natural lakes and ponds such as 'Kanewal' and 'Vank talav'. Water is scarce, specially in summer. Being the drainage area for the monsoon and flood waters of the Sabarmati, Vatrak, Sedhi and other small rivers, the land is highly fertile.

In *Bhalbaru*, wheat, rice and cotton are grown. The *Charotar* has been labelled the garden of western India. The north-eastern side of the district forms a higland known as *Mal*. It gradually merges with the Aravalli range. The geographical situation of the region, specially *Bhalbaru* and *Charotar*, attracted the Harappans. Wholly Harappan settlements have been found (Momin 1972-74) in this region. Most of them are in *Bhalbaru* while some are in *Charotar*. Harappan sites like Kanewal, Khaksar, Padra, Rel, Khanpur, etc., are around Kanewal—a natural lake. Others, such as, Changda, Popatpura, Khanpur, Jafrabad, Budhej, Jinaj are situated along the course of a natural stream, now known as *Alang* canal. Indranaj is a 'Vank talav', formed by a series of dunes. Sites like Vadgam and Vaghe talav are very close to the river Sabarmati.

Most of these Harappan sites are now under cultivation. No brick structural debris was seen, which suggests only a thin deposit. Kanewal, Nar and Gudel have a fairly thick deposit; evidently they were occupied for a longer duration. The area inhabited is also limited, generally 50 to 100 square metres. But sites like Kanewal, Vadgam, Gudel and Nar are considerably larger, measuring about 300 square metres. Sites like Kanewal and Nar have a fairly thick deposit, about 1.5 metre.

These Harappan sites are spread over an area of about 30 kilometres each, about 2 to 4 kilometres from the other. Of the twenty sites, Kanewal, Nar and Vadgam were probably large villages, and the rest, temporary settlements. It also appears that there were hamlets. As these were close to either the river or ponds, the Harappans had access to a dependable source of water. The ponds are mostly near the dunes which seem to occur more frequently on the eastern side of the Sabarmati. The distribution points to the prevalence of strong winds from the south-west especially in summer, when the dry sand could be shifted. This phenomenon can be seen

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

in the area even now.

The animal remains from the surface and excavations indicate the presence of cattle, such as the cow, buffalo, goat and sheep. Possibly domesticated, these animals either belonged to cattle breeders or mixed farmers.

It is interesting to note the presence of the rhinoceros and wild pig, which require marshy conditions for their habitation. This suggests that part of this region may have even been marshy. The nilgai, chital and deer also roamed here then. These, therefore, indicate climatic stability over a long period of time in this region.

The excavation at Kanewal (Momin 1980) has presented ample evidence about the life of Harappans in this region. They lived in circular huts which had well rammed earthen floors, wooden posts and walls of wattle and daub. These are the predecessors of the modern Kuba which has a continuous tradition going back to the Harappan period.

The presence of pots like jars, dishes, bowls, dishes-on-stand indicate that the huts were used for living purposes. Even terracotta lamps and votive tanks existed. It seems that the cruder types of ware were used for cooking, storage and similar functions, for soot had stuck to their bottoms, while dishes-on-stand, bowls and small lota-like water vessel had other uses.

They used mostly four types of pottery, the

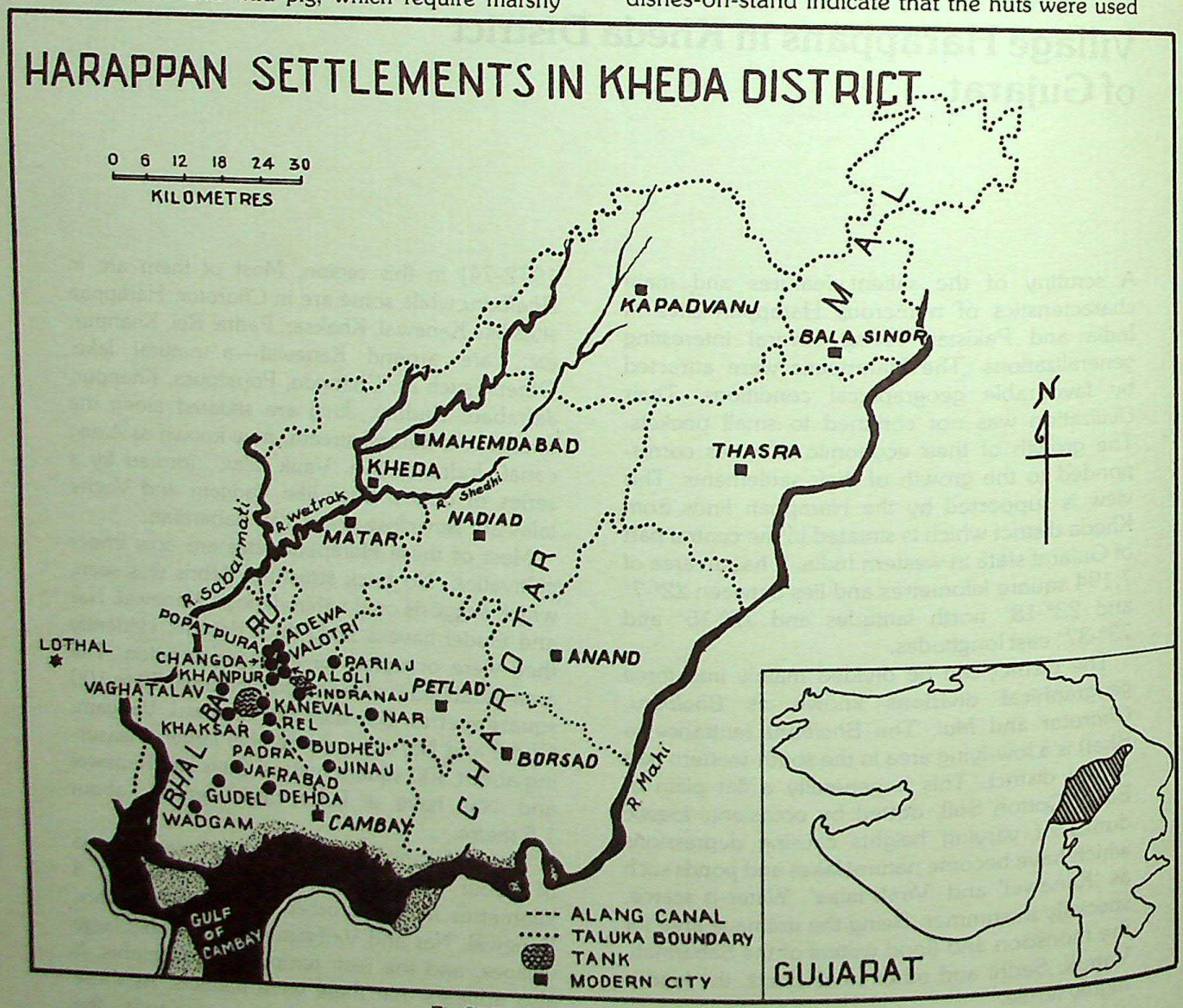


Fig.27.1. Harappan sites in Kheda

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Red ware, Buff ware, Lustrous Red Ware and a crude incised ware. They occur together throughout the habitat. Their perfect shape and elegance in manufacture indicate specialization. If these wares were imported, their place of origin cannot be ascertained for want of data. The similarity the pottery has with that of Lothal B and Rangpur IIB, IIC and III periods indicates contact with larger urban settlements.

The terracotta triangular and round, and *mushti* cakes (oblong with finger-marks) finds also are significant. The interesting discovery of twenty-six terracotta balls from one of the huts seems to point to their being carefully stored. They appear to be missiles either for defence or warding off wild life. They are also found at all other sites. Even net-sinkers were found at Kanewal and Indranaj.

The Harappan people at Kanewal adorned themselves with various types of beads made from cornelian, faience, shell and terracotta. The dressing of these beads into various shapes, and their fine polish show that these folk had developed high aesthetic sense and standard in lapidary art. Copper was also used for making ornaments. Strips of copper and a bangle were recovered from Karewal.

The evidence of terracotta spindle-whorls suggests that weaving and spinning were known.

Terracotta and stone marbles, terracotta toy cart-wheels, figures of bulls and birds were also there.

The knowledge of the cardinal directions is suggested by the graffiti design on a potsherd which shows four lines intersecting each other at one point and each line terminating with a symbol. They even had their own script. The letters were found on oblong terracotta balls from Jinaj and on shards from Kanewal. A terracotta sealing with a Swastika figure from Jafrabad suggests their contact with other urban Harappan centres.

In the absence of any direct evidence, it is difficult to comment on their food habits. The medium of black soil in Kheda district is fertile enough and easy to plough. Cotton and wheat, two important crops of the Harappans, are being cultivated in this region even today. A distribution map of the spread of the Harappan culture placed over the map of the conventional regions for growing cereals shows that the Harappans flourished essentially in the wheat growing regions of Sind, Punjab and Gujarat (Fairservis 1971: 311). Some potsherds show the use of grain chaff as a degraissant. Even the big storage jars suggest that they were ready to face lean periods. The discovery of a large number of querns, muller and rubber-stones suggests that grains must have formed the major part of the food of the people. The querns with a central depression associated with pestle stones might have been used for grinding. Even small vessels like globular pots *(handi)* and shallow dishes *(kaladi)* with black soot at the bottom were probably used for cooking.

The fact that animals such as the cattle, buffalo, goat, sheep, deer, chital, barasingha and nilgai; and reptiles, like the lizard, formed important dietery items, is evidenced by the presence of split long bones and charred bones of these animals. The occurrence of a large number of bones suggests that the food economy of these inhabitants depended equally on the animals existing in the neighbourhood.

Animals such as the bullocks, horses and camels were used for transport since their bones have also been found in the habitational deposits.

Conclusion

The geographical set-up of Kheda district attracted the Harappans to settle on the dunes and around the natural lakes which were surrounded by fertile plains of Black Cotton Soil. They lived in circular huts. Kanewal was a very small village-settlement with just a few groups of huts on the periphery of the dunes. The dunes probably protected their huts from strong winds. Other sites in this region were scattered hamlets or, more probably, temporary settlements or seasonal camping-places. The inhabitants must have been cattle breeders, mixed farmers and hunters. They were in contact with Harappan urban settlements like Lothal and Rangpur, which had achieved a high degree of economic sophistication. These Harappan settlements in the district, is a connecting link of their migration towards south Gujarat. It is interesting to note that this area is used, even today, as a seasonal route of migration by the herdsmen moving between Kutch, Saurashtra and Gujarat. This trend may have existed in the past too. This indicates a type of movement that was noticed between Kutch and Banaskantha. The settlements incidentally show evidence of movements of the Harappan

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

people in central Gujarat.

ACKNOWLEDGEMENTS

This paper is based on the results of explorations and excavations carried out by the writer under the guidance of Prof. R.N. Mehta to whom he is highly indebted for all help. Thanks are also due to Dr. (Mrs.) D.R. Shah who helped in the study of the bones of the animals, collected from exploration and excavations from the district.

REFERENCES

Momin, K.N. 1971-72. Chalcolithic Settlements in Bhalbaru. *Journal of the Maharaja Sayajirao University of Baroda.* Vol. 20, no. 1; vol. 21, no. 1.

———. 1973-74. The Chalcolithic Settlements in Kaira District, Gujarat State. *Journal of the Maharaja Sayajirao University of Baroda,* Vol. 22, 1; Vol. 23, 1.

———. 1980. The Excavations at Kanewal. Paper presented in The Archaeological Congress held at Bhopal (unpublished).

Rao, S.R. 1957. Excavations at Lothal. *Lalit Kala.* 3 & 4.

———. 1962-63. Excavations at Rangpur and Other Explorations in Gujarat. *Ancient India.* No. 18-19.

Fairservis Jr., Walter A. 1971. *Roots of Ancient India.* London.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

28

S.A. Sali

Late Harappan Settlement at Daimabad

The discussion on the topic of 'Harappan contacts in the Deccan' was initiated in the forties of this century by M.H. Krishna (Wheeler 1948: 222, fn.3), when he asserted that the painted pottery of Brahmagiri is 'remarkably similar to some Indus Valley pottery'. Wheeler (1948), however, could not see any resemblance, technically, or artistically, between the Brahmagiri and the Indus Valley ceramics and hence thought that this assertion was without any sort of foundation.

The Problem

Thapar (1957: 24) summed up his observations on the affinities of the Chalcolithic culture of Maski with other Chalcolithic cultures, including Harappan, as follows:

> (a) The long blades are reminiscent of the Harappan ribbon-flakes; (b) the cylinder-seal may show contacts with Sumer; (c) the painted pottery may be related to the painted pottery of Central India and northern Deccan, which in turn, is vaguely related to the Harappan Culture, the evidence, however being more indicative than conclusive.

In recent years it is being emphasized that the Harappans had trade contacts with the Neolithic/Chalcolithic communities of the Deccan, especially southern Deccan. Rao (1973) is of the opinion that the Neolithic people of the Deccan supplied steatite and gold in return for copper tools and beads of gemstones to the Harappans. He also felt that (Rao 1969: 6) the merchants of the Konkan-Malabar coast sailed to ports in Gujarat to trade with the Harappans.

Allchin and Allchin (1968) feel that the source of gold for the Indus Civilization was the Mysore reefs—the Hatti gold bands. Wheeler (1968) also suggests that part of the gold may have come through trade-channels, from south India. Sarma (1972) finds the influence of the Harappans on the people of earliest levels of Maski, Brahmagiri, Piklihal, Tekkalkota, Hallur, Patapadu, Pusalpadu and Daimabad in the occurrence of Harappan type long blades, steatite discular or micro-beads, gold objects, terracotta bulls and copper axes, knives and pins. He also attributes the spread of crested-guiding ridge technique of blade production into the Neolithic-Chalcolithic sites in India to Harappan intercourse. Sundara (1971) has tried to show similarities between certain painted designs on the pottery of Maski and Savalda fabrics from the upper Krishna Valley and Indus Valley pottery and holds that they indicate several influences from the regions of Baluchistan and the Indus Valley during the period from the pre-Harappan to Late and post-Harappan cultures.

The above views with regard to the Harappan contacts in the Deccan summarized in very brief, imply that the Harappans may have had contacts with the people of the Neolithic/Chalcolithic cultures of the Deccan during their Mature as well as Late phases.

As is well-known, the nuclear region of the Indus Civilization was the Indus valley. In its Mature Phase it diffused in all directions and maintained trade contacts with Central Asia, north-eastern Afghanistan, north-eastern Persia, and nearer home with Rajasthan, Gujarat and Baluchistan. However, trade contacts with the Deccan have yet to be fully examined. For this purpose it is necessary to know the cultures in this

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

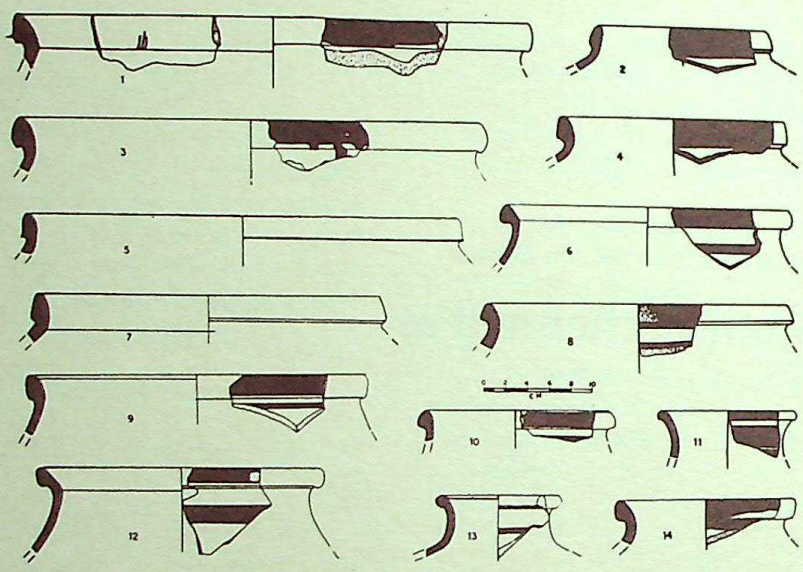


Fig.28.1. Daimabad: Pottery, Late Harappan

region which were contemporary with the Mature and the Late Phases of the Harappan culture.

CONTACTS DURING MATURE HARAPPAN PHASE

The Neolithic of Andhra and Karnataka

The regions figured in the discussion on the subject of Harappan contacts with the Deccan are mainly those of Andhra and Karnataka. Here the earliest Neolithic phase is represented at Kodekal which, by the ^{14}C date , is ascribable to *circa* 2300 B.C. (Sankalia 1974). On the basis of radiocarbon results, the Neolithic phase of Utnur may be dated between *circa* 2200 and 1900 B.C. (Sankalia 1974). But the Neolithic phase represented by Tekkalakota I, Hallur, Sanganakallu I, T. Narasipur, Terdal and Palavoy is datable by ^{14}C dates between *circa* 1900 and 1500 B.C. (Sankalia 1974). The last phase of this culture, with an increase in the number of tools of copper and bronze, represented by Tekkalakota II, Hallur overlap phase and Paiyampalli Neolithic can be dated on the basis of available ^{14}C dates between *circa* 1500 and 1000 B.C. (Sankalia 1974). Thus, on this showing, the only Neolithic phase which can be said to have co-existed in the southern Deccan with the mature Harappan phase was that represented at Utnur and also at Kodekal (late phase of the

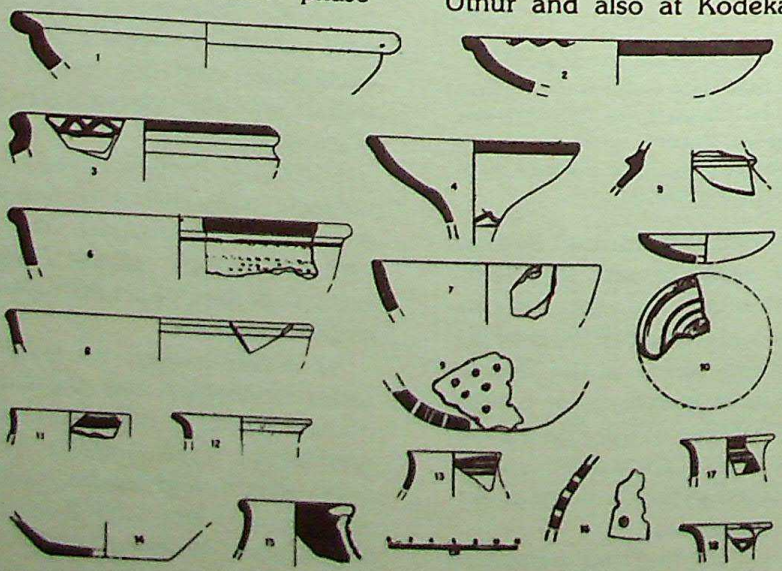


Fig.28.2. Daimabad: Pottery, Late Harappan

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

earliest occupation) because the ^{14}C date of 2400 B.C. is for the mid-phase here (Sankalia 1974).

Allchin and Allchin (1968) have equated the occupation at Utnur with the lower Neolithic of Piklihal, Maski I, and parts of Brahmagiri IA in a period from *circa* 2300 to 1800 B.C. They regarded it a primary Neolithic phase in the complete absence of metal. This span of period lies within the Mature Harappan phase. Therefore, the highly organized urban Harappans of Gujarat and the Indus Valley traded, if at all, with people of the primary Neolithic phase in the southern Deccan.

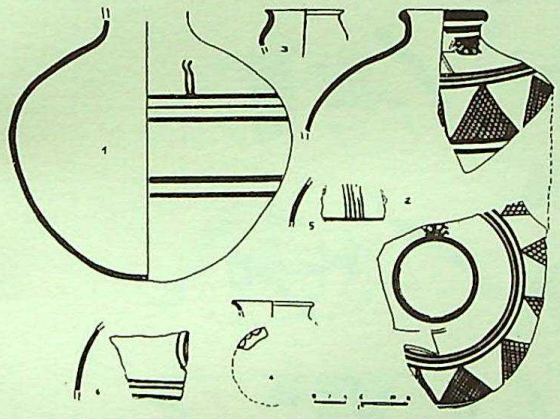


Fig.28.3. Daimabad: Pottery, Late Harappan

No copper tools have so far been found in this early Neolithic phase of southern Deccan. There is also no evidence that they were a sea-faring people, because the so far known sites of this phase lie well into the interior. Hence we cannot conjecture, at this stage, that merchants of the Konkan-Malabar coast sailed to parts of Gujarat to trade with the Harappans.

However, the Harappans may have established a land route to trade with southern Deccan. This route should logically pass through that region of Maharashtra which is contiguous with Andhra, Karnataka and Gujarat. Hence, Harappan contacts in the Deccan will have to be studied, in the first instance, by the evidence of Chalcolithic culture in Maharashtra which co-existed with Mature Harappan phase.

Maharashtra and Karnataka

Two areas in Maharashtra are of interest to us in the present context: the central Tapi basin and the upper Godavari basin. In the former region, the geographical position of Dhule district is interesting in that it forms a border with the Surat and Broach districts of southern Gujarat. In the course of his exploration in this district, this author (Sali 1964) unearthed a number of sites with a distinct class of Chalcolithic painted pottery, designated Savalda Ware, after the type site Savalda, located on the left bank of the river Tapi. Surface observations indicated that stratigraphically the Savalda Ware underlay about one metre thick occupational deposit yielding Late Harappan red ware and that it represented the earliest so far known Chalcolithic culture of the region (Sali 1972; 1973). At a village in Andhra, an ash mound was found associated with the cultural deposit of the Savalda culture (Sali 1968).

Subsequently, Sundara (1971) found sites with Savalda ware in the upper Krishna basin in Karnataka. In the excavations of the ancient site at Terdal in Bijapur district, he found this pottery in layers 2 and 3 for which the ^{14}C dates are 1935 ± 100 B.C. respectively. In spite of the discrepancies in these dates, it would not be unreasonable to assign a period between *circa* 2000 B.C. and 1700 B.C. for this culture, if not earlier.

In the region of Maharashtra it was not possible to understand and date, through excavation, the stratigraphic position of the Savalda culture in relation to the other till then known Chalcolithic cultures of the region until this author undertook excavations at Daimabad. The evidence obtained from the excavations here has an important bearing upon the subject under discussion.

The Chalcolithic site at Daimabad (Lat. 19°31' N., Long. 74°42' E.) lies on the right bank of the river Pravara, a tributary of the Godavari, in the Shrirampur taluka of Ahmednagar district of Maharashtra. The site was discovered by Bopardikar (*IAR* 1958-59), in the year 1958-59. It was excavated by three different scholars. First in 1958-59 by Deshpande (*IAR* 1958-59), then in 1974-75 by Rao (*IAR* 1974-76; also 1978) and third time by this author for four seasons, from 1975-76: 1976-77; 1977-78 and 1978-79 (Sali 1981).

Deshpande divided the evidence into three phases: Phase I represented Neolithic; Phase II belonged to the Malwa culture; and Phase III was the Jorwe culture.

The chance discovery in a pit under a tree by a villager in 1974 of four solid bronzes—an

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

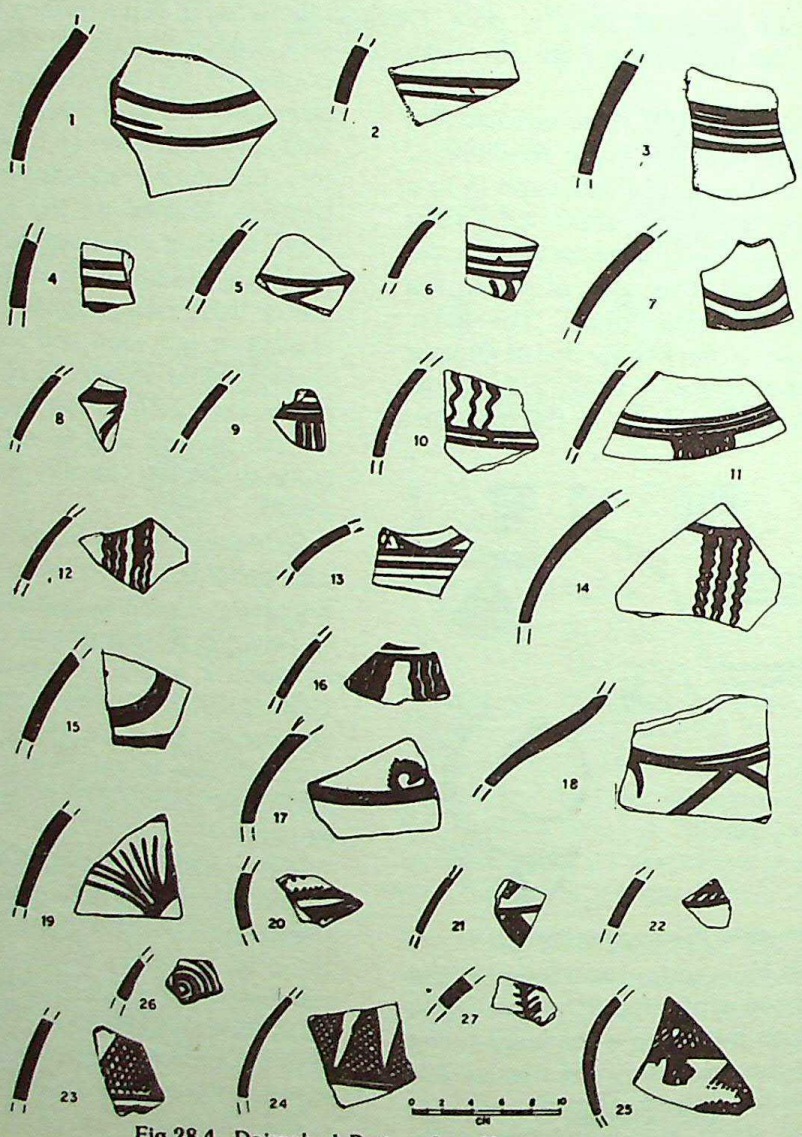


Fig.28.4. Daimabad: Pottery, Late Harappan

elephant, a rhinoceros, a buffalo and a chariot—displayed sophisticated metallurgy which necessitated fresh excavation of this site. Rao (1978) excavated the site with the main objective of reassessing the cultural sequence of the site and ascertaining its cultural contacts, if any. He divided the occupational deposit into three periods.

Period I (1900-1700 B.C.) was divisible into two sub-periods, A and B. The sub-period IA represented the first Neolithic settlement and was noted for plain hand-made pottery. The sub-period IB was characterized by the slow-wheel made pottery painted in red over a greyish or red surface. The three main ceramics of sub-period IB were the grey-slipped ware, a dark grey burnished ware and a dull red ware. A few vessels were turned on a fast wheel. Painted designs constituted of vertical wavy lines drawn in groups, cross hatched bands and ladders and an antelope. These designs suggested, according to Rao, contacts with the late Harappans who had by now moved to the Tapi and Godavari valleys.

Period II (1700-1500 B.C.) was characterized by the Malwa Ware and the Cream Slipped Ware. Rao is of the view that the paintings on the Malwa Ware were influenced to a large extent by the Late Harappan designs such as hatched diamonds and dancing figures.

During Period III (1500-1000 B.C.) Malwa Ware decreased and Jorwe Ware increased. The main types found were stemmed bowls of Rangpur II C concavo-convex type bowls, spouted vessels and globular jars.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Rao also claimed to have identified furnaces used for refining copper. He is also thought to have obtained evidence of the survival of the Indus script in periods II and III in that most symbols on pottery were identical with the cursive alphabets of the Late Harappan Phase in Gujarat and the Indus Valley.

Period III	– Buff and Cream Ware Culture (1800 - 1600 B.C.)
Period IV	– Malwa Culture (1600 - 1400 B.C.)
Period V	– Jorwe Culture (1400 - 1000 B.C.)

The outstanding features of this excavation in the present context are: (1) that the earlier surmise that the Savalda Culture represents the earliest so-far known Chalcolithic culture of the region of Maharashtra, has been established; (2) that this culture preceded the Late Harappa Culture which fact makes it contemporary with the Mature phase of the Harappa Culture in Gujarat and the Indus Valley; and (3) that the Harappans entered the upper Godavari basin

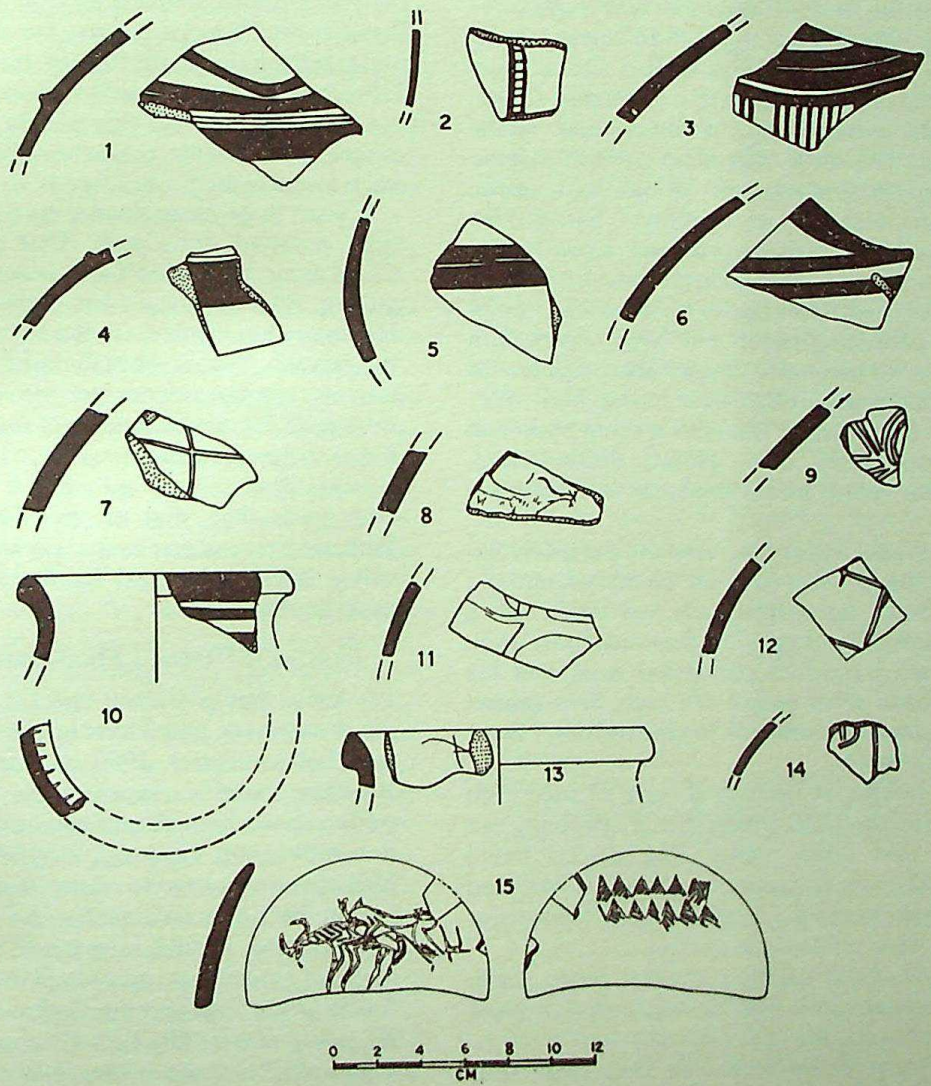


Fig.28.5. Daimabad: Pottery with painted and graffiti motifs

Excavations by this author in the five-metre thick occupational deposit revealed evidence of five Chalcolithic phases, each one characterized by the occurrence of a distinct class of painted ceramic of its own.

Period I	– Savalda Culture (2200 - 2000 B.C.)
Period II	– Late Harappa (2000 - 1800 B.C.)

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

early in the second millennium B.C.. Here we are concerned with the evidence of the Savalda Culture. The evidence about the Harappans will be dealt with later.

The settlement of the Savalda Culture here was small, measuring roughly 3 hectares, and confined chiefly to a narrow strip of black cotton soil nearer the bank. This culture was characterized by Savalda Ware of medium-to-coarse fabric. Made on a slow-wheel, it is treated with a thick slip. It was chiefly painted in a red ochre colour and only occasionally in black and white pigments. The most interesting painted designs occurring on this ware in central Tapi, upper Godavari and upper Krishna basins are antennae-ended arrows, notched arrow-heads, spears, unilaterally barbed tools resembling saws, double-barbed fish-hooks, harpoons, plant motifs, peacocks, fishes and birds. Apart from these, varied geometric designs also occur on this ware. The types in this ware in the Tapi valley include high-necked jars with a squat body and blunt carination, dish, platter, dish-on-stand, trough or basin, bowl, ring-stand and knobbed lid.

At Daimabad the types were comparatively few and included vases with an outcurved rim and squat body, *handi*-type vase and vases with a short, splayed-out rim. The burnished grey ware, the black burnished corrugated ware and the hand-made thick coarse red were with incised and applied decorations, were the other associated ceramics.

The houses at Daimabad were of mud-walls with a rounded end, trilateral, of single room, two rooms and three rooms. The objects found included copper-bronze rings, beads of cornelian and agate, microliths, tanged and notched arrow-heads, stone mullers and querns.

People of this culture cultivated barley, lentil, common pea, grass pea, black gram/green gram, horse gram and the hyacinth bean.

The most easily accessible land route from Gujarat into the Deccan is through the Songarh Pass, via the present administrative unit of Dhule in the Tapi valley, and then the Godavari and the Krishna valleys. What sort of contacts the Harappans of Gujarat and the Indus Valley had with the people of these river valleys is worth investigation. The occurrence of certain pottery types like dish-on-stand and beakers in Savalda Ware may or may not represent Harappan influence. Also, it is not understood whether similarities, in minor geometrical and other designs, colour scheme and surface colours, as pointed out by Sundara (1971), are attributable to influences from Baluchistan and the Indus Valley because, there is no known chalcolithic painted ware either in Baluchistan or the Indus Valley which could compare in design, fabric and type with Savalda Ware. If the Harappans knew the source of gold and steatite in southern Deccan, it would be logical to believe that it should have been known to the contemporary Savalda people also. Objects of gold and steatite have, however, not so far been found in the Savalda levels.

It is still to be ascertained if the Savalda people used polished stone axes. That the Neolithic/Chalcolithic people of India knew the crested-guiding ridge technique has nothing to do with Harappan intercourse. On the whole, materially, the Savalda culture of Maharashtra and Karnataka is greatly inferior to the contemporary urbanized Harappan culture of Gujarat and the Indus Valley. It needs, however, to be noted that Savalda Ware in the Tapi valley is finer in fabric and finish than that in the Godavari basin. Perhaps this was due to the dwellers of the Tapi valley being influenced by the Harappans of neighbouring Gujarat.

Contacts During Late Harappan Phase

We know that in Gujarat and the Indus Valley, the decadent or Late Phase of Harappan Culture falls between *circa 1900* B.C. and 1700 B.C. Whether these Harappans were able to keep trade contact with distant southern Deccan is a debatable point. However, available evidence in Maharashtra seems to show that, during this period itself or a little earlier, the Harappans of Gujarat, and, possibly of parts of the Indus Valley, had moved into, and established their settlements in the Tapi and the Godavari valleys. The discovery of over fifty Late Harappan sites in the Tapi valley and the evidence from the excavations at Daimabad have amply proved this.

The Late Harappans in the Tapi Valley

This author has described in detail elsewhere (Sali 1970) the nature of Harappan Culture in Tapi valley. In brief, the explorations in Dhule district have proved that a considerably large part of the Harappan population made settlements in the region. There is however no evidence of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

urban discipline typical of the Mature Harappa, or of flourishing trade and commerce. Because, the form one sees is of an inferior culture of a rural community, their sea-trade and literacy, however, being still unforgotten as is apparent from the graffitti of a sailling ship and the two characters of their script painted on a potsherd. Thus, Harappa Culture as revealed in the Tapi valley is of a degenerate or Late form rather than that of a Mature one. This discovery has left no doubt that, even when moved and settled in so distinct a region as the Tapi valley, the authors of this culture have retained their clear identity as Harappans; it does not matter to what extent their culture equipment degenerated.

CONCLUSION

As a result of the excavations at Daimabad, the Harappans in the Godavari valley are better known than their counterparts in the Tapi valley.

The overall pattern of the Harappa Culture as represented at Daimabad is that of a Late or Degenerate form. The elaborate 'Indus' and the 'Provincial' styles of painted designs were
86 replaced by that of monotonous geometric
88 designs. The use of mud-bricks for houses was
90 sparingly made and the mud-wall houses were more in practice. The tradition of producing mud-bricks in the ratio of 1:2:4 did not die out
89 completely. The internally mud-brick-lined coffin
91 represents survival of the practice of the struc-
93 tural coffin. Their art of writing was not forgotten and the seals of steatite were replaced by those of terracotta. It is quite likely that the copper/bronze celts were manufactured by them at Daimabad. The four bronzes found by chance in a non-stratified context were their sacred belongings, the objects in their worship and, as Sankalia (1981) has suggested, they were brought here by refugees. The available evidence suggests that the Harappans at Daimabad had to abandon the site for the reasons not yet clear. The abandonment may have been in a hurry. Otherwise the bronzes would not have been left by them there.

The city life once enjoyed in their homeland was just not there at Daimabad. Yet the town of considerable size, occupying over 20 hectares of land, Daimabad may have been a capital of the Harappans of the region of the Godavari basin in Maharashtra.

Thus from the above evidence it has become now quite evident that the Harappans had penetrated the Deccan deep into the Tapi and the Godavari valleys. Inspite of their having been moved several hundred kilometres south or rather south-east of the Indus basin—the nuclear region of their culture—they had not lost their identity as Harappans, but now they were the 'feeble descendants of the Harappans' and, hence, the Late Harappans.

ACKNOWLEDGEMENTS

I am extremely thankful to various scholars who have helped me in my excavations in various ways, particularly to Shri M.N. Deshpande, Shri B.K. Thapar, Dr. D.P. Agrawal and Dr. M.D. Kajale.

NOTES

In the light of the evidence of the sequence of Chalcolithic cultures revealed at Daimabad, the excavated pottery from the lower levels of the Chalcolithic at Prakash was re-examined by the excavator, Shri B.K. Thapar and this author at Aurangabad. It was found that Savalda Ware occurs in the lowest levels at Prakash. This is succeeded by the (Late) Harappan Red Ware which in turn is succeeded by the Buff and Cream Ware. Above this, perhaps, occurs the Lustrous Red Ware.

REFERENCES

Agrawal, D.P. 1965. Notes. In *Indian Prehistory 1964*.V.N. Misra and M.S. Mate eds. 32; 138-141. Poona:

Allchin, Bridget, and Allchin, Raymond. 1968. *The Birth of Indian Civilization*. Penguin Books.

David, M., and Sunta, C.M. 1980. *Applications of Thermoluminescence of Quartz*. BARC-1074. Bombay; Bhabha Atomic Research Centre.

Deo, S.B. 1969. *Songaon Excavation 1965*. Poona. Deccan College.

Deo, S.B., and Ansari, Z.D. 1965. *Chalcolithic Chandoli*. Deccan College Building Centenary and Silver Jubilee Series. No. 39. Poona.

Dhavalikar, M.K. 1977. Inamgaon: The Pattern of Settlement. *Man and Environment*. Vol. 1; Ahmedabad; 46-51.

Indian Archaeology - A Review (IAR) 1958-59, 1974-75, 1975-76, 1976-77, 1977-78 and 1978-79.

Rao, S.R. 1969. Presidential Address. Conference of Keladi Dynasty held at Shimoga. 18-20 May 1969.

———. 1973. *Lothal and the Indus Civilization*. Asia Publishing House. Bombay.

———. 1978. *Illustrated London News*. April 1978; 74-75.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Sali, S.A. 1964. A New Ceramic of the Chalcolithic in Dhulia District (Maharashtra State). *Journal of the Asiatic Society of Bombay*, Vol. 38; 207-210.

———. 1968. Ash Deposits from the Chalcolithic sites at Balsana, Kandhra and Bhamer in Northen Deccan. *Proceedings of the 55th Session of the Indian Science Congress*, Abstracts; 534.

———. 1970. The Harappa Culture as Revealed through Surface Explorations in the Central Tapti Basin. *Journal of the Oriental Institute.* M.S. University of Baroda; Vol. XX; 2; 93-101.

———. 1972. In *Archaeological Congress and Seminar Papers.* S.B. Deo ed. Nagpur. 180.

———. 1973. In *Radiocarbon and Indian Archaeology.* D.P. Agrawal and A. Ghosh eds. Bombay: Tata institute of Fundamental Research. 499-500.

———. 1980 *Stone Age Culture Sequence at Patne, District Jalgaon, Maharashtra.* Ph.D. Thesis; University of Poona. (Unpublished)

———. 1981. A Potter's kiln of Jorwe Culture from Daimabad. In *Madhu: Recent Researches in Indian Archaeology and Art History;* M.N. Deshpande *Felicitation Volume.* M.S. Nagaraja Rao ed. Delhi. 59-62.

Sankalia, H.D. 1974. *Prehistory and Protohistory of India and Pakistan.* Poona: Deccan College Post-graduate and Research Institute.

———. 1981. The Daimabad Bronzes. In *Madhu: Recent Researches in Indian Archaeology and Art History;* M.N. Deshpande Festschrift. Delhi. M.S. Nagaraja Rao ed. 23-24.

Sankalia, H.D., Deo, S.B., Ansari, Z.D. and Ehrhardt, S. 1959. *From History to Prehistory at Nevasa.* Poona: Deccan College.

Sarma, I. Kartikeya. 1972. South-East Asia, India and West Asia, (A study on the beginning of the 'Food-Producing State'. In *Archaeological Congress and Seminar Papers.* S.B. Deo ed. Nagpur.

Sundara, A. 1971. Chalcolithic Phase of the Upper Krishna Valley. In *Studies in Indian History and Culture;* Prof. P.B. Desai Felicitation Volume. Shrinivasa Ritti, and B.R. Gopal eds. Dharwar. 13-30.

Thapar, B.K. 1957. Maski 1964: A Chalcolithic site of the Southern Deccan. *Ancient India.* No. 13; 4-142.

Wheeler, R.E.M. 1948. Brahmagiri and Chandravalli: Megalithic and other Cultures in Mysore State. *Ancient India.* No. 4; 180-310.

———. 1968. *The Indus Civilization.* Cambridge University Press. Third Edition.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

29

M.K. Dhavalikar

Sub-Indus cultures of Central and Western India

The last six decades since the discovery of the Indus Civilization have produced a vast mass of evidence relating to the Harappans not only in India and Pakistan but beyond their frontiers as well. Some interesting evidence throwing light on the origins and end of this great civilization has also been brought to light by recent excavations, more especially those in India which enables us to visualize the Harappan succession in western India. The Harappans were people of the plains and, in the course of their expansion, they selected for their settlements new areas which offered similar environment. Although they reached as far south as Narmada or even the Tapti and the Pravara valleys as new evidence shows, they do not seem to have crossed the Aravallis and entered into the fertile tracts of central India. Their precursors—the Pre-Harappans, or the Early Harappans as they are now called—however, appear to have done so as the evidence from the Kayatha excavations shows.

The general character of the Harappan settlements of western India and Malwa is well known. Interestingly, in the Saurashtra peninsula, the Harappa culture did not vanish abruptly as it did in Punjab and Rajasthan; on the contrary we find it degenerating into a village based Chalcolithic culture, as at Rangpur. Another culture, which bears an indelible stamp of the Harappan, is the Prabhas culture which flourished in Saurashtra. In Malwa, on the other hand, we have Kayatha like cultures which have been included in the broad group of Harappa culture. The present paper deals specifically with two cultures: the Kayatha culture, which has distinct pre-Harappan

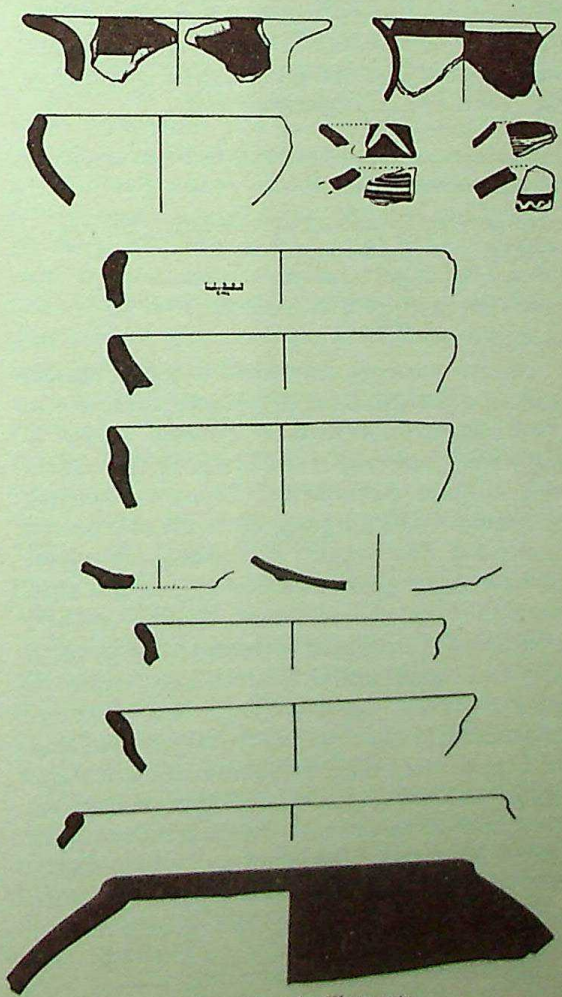


Fig.29.1. Kayatha Ware pots

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

or Early Harappan affinities and the Prabhas culture, which is a direct descendant of the Harappan culture. In Maharashtra also, recent explorations have revealed Late Harappan material in the Tapti and the Godavari-Pravara valleys. All these cultures have been classed by Mortimer Wheeler, as the Sub-Indus cultures (Wheeler 1968: 66).

THE KAYATHA CULTURE

The ancient site of Kayatha (Dist. Ujjain, M.P.) was discovered by V.S. Wakankar of the Vikram University, Ujjain, and was excavated by him in 1965 and 1966 (Wakankar 1967) and by the writer and Ansari in 1968 (Ansari and Dhavalikar 1971) in collaboration with Wakankar. Kayatha can be identified with ancient Kapitthaka which was the birth place of the celebrated astronomer, Varaha-mihara. The ancient site is situated on the right bank of the river Chhoti Kali Sindh, a tributary of Kali Sindh which in its turn, is a tributary of the Chambal. The first settlers possibly also gave the river the name of the great Indus.

The excavations revealed a five-fold sequence of cultures as follows:

Period I	:	Kayatha culture (*circa* 2000 - 1800 B.C.)
Period II	:	Banas culture (*circa* 1700 - 1500 B.C.)
Period III	:	Malwa culture (*circa* 1500 - 1200 B.C.)
Period V	:	Sunga-Kushana-Gupta (*circa* 200 B.C.-600 A.D.)

We are presently concerned with the Kayatha culture which has been named after the type site. The earliest inhabitants of Kayatha appear to have occupied only a small area of the ancient site, for the remains of their culture are confined to the north-western periphery of the site near the river bank. The Kayatha culture does not appear to have developed at the site but, on the other hand, it seems to have already evolved elsewhere. The culture is characterized by three distinct ceramic industries which have, so far, no parallels within the country. Its tool outfit was chalcolithic in character, for the people used tools of copper and bronze and also has a specialized stone blade-flake industry. As the excavation was of a limited nature, no complete house plans were recovered, but the available evidence shows that the people lived in houses of mud. The house floor was made of yellowish river silt plastered with mud whereas the roof above was supported by wooden posts.

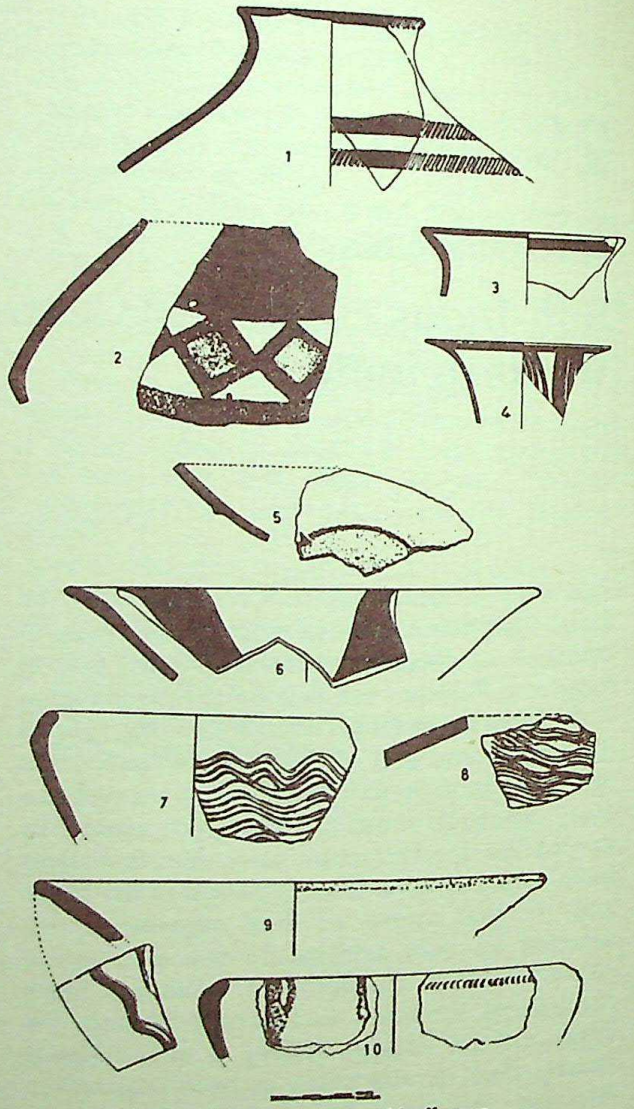


Fig.29.2. Kayatha: Painted buff ware

The principal ceramic industry of the Kayatha culture is a fine sturdy pottery dressed with a thick brown slip usually from lip to shoulder, and sometimes extending upto the base as well **(fig. 29.1)**. Over the dark brown ground were executed painted patterns in violet or deep red. The designs are all linear and appear only on the upper half of the vessel, particularly on the rim. The shapes include bowls and basins, vases with a globular profile and concave neck and storage jars. A majority of the vessels in this ware have been provided with a ring base which, however, was functionally ineffective as the base in several cases is seen bulging below the ring. The same feature is also to be found in the Early Dynastic II and III (*crica* 2700-2500 B.C.) pottery in West Asia (Delougaz 1952: Pls. 156, 159, 178, 183,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

185, 192 and 193). It is now unlikely that such a ring base was provided with a view to accommodating the vessel on some sort of stand. There are also a few vessels with a disc base. This ware has been named Kayatha ware after the type site.

Kayatha ware bears some resemblance with the dark slipped ware from Sothi (Rajasthan) as far as the fabric and the surface treatment is concerned. Moreover, the deep bowl with beaded rim and the globular jar with concave neck which occur in Kayatha ware have corresponding forms in Sothi ware. It may, however, be stated that the latter does not bear painted patterns in red or violet. A majority of Sothi vessels have ring bases and we also come across a few examples wherein the base is seen bulging below the ring as inware? The similarity between the two wares, however, cannot be stretched too far. But all the same, the features common to both are significant. It may incidentally be stated that the Sothi culture has now proved to be Pre-Harappan culture which contributed, to some extent, in the make-up of the Harappan culture (Ghosh 1965: 115).

Kayatha ware also recalls to mind some of the Harappan vessels which are treated with a dark chocolate slip all over (Mackay 1943: 67 & 85, Pl. XXXV, 2). But they do not bear painted patterns in red. A huge storage jar with a heavily beaded rim in Kayatha ware shows a significant likeness to the corresponding Harappan form. It may also be stated here that a couple of shards from the earliest occupational phase at Prakash (Maharashtra) painted with a broad zone on the neck are akin to those in Kayatha ware (Thapar 1967: 42, **fig. 9, 24 & 26**). Kayatha ware thus has a few parallels in the Early or Pre-Harappan pottery, and the culture can, therefore, be classed as a Sub-Indus culture.

Another distinguishing feature of the Kayatha culture is the red painted buff ware. It is thin-walled and extremely fine in fabric. The painted patterns, which are mostly linear, are executed in red. The repertoire of shapes in this ware is extremely limited. The commonest amongst them is the typical Indian *lota*, a small water vessel with flaring mouth, round bottom and a carinated body. Besides, there are high and short concave-necked jars and basins **(fig. 29.2/ 1-6)**.

A very interesting feature of Kayatha ware is the 'Combed Ware' which is characterized by combed designs on the exterior of vessels **(fig. 29.2/ 7-10)**. This is a red ware of fine fabric, usually without slip or wash, but bearing incised patterns. The designs include multiple zig-zags and chevrons, etc. which have undoubtedly been executed by a comb-like instrument. Only bowls, basins and *handies* are represented in this ware. Very rarely do we come across vessels painted with broad zones in red **(fig. 29.2/6)**. Pottery with similarly combed patterns on the exterior of vessels also occurs at Sothi. The latter, however, bears rather deep incisions whereas the Kayatha examples are characterized by shallow, incipient incisions. But special mention must be made of an exactly similar shard in the Sothi collection. Besides, coarse, handmade red/grey pottery also occurs in great profusion.

The people of the Kayatha culture used both copper and stone tools. They already appear to have mastered the technology of copper before their arrival at Kayatha. This is evidenced by the find of two fine copper axes having a sharp cutting edge and lenticular section; the other edge has been hammered and thickened obviously for making it convenient for hafting. The axes seem to have been cast in moulds. Besides there is also a fragmentary copper chisel. Mention should also be made of twenty-eight copper bangles which were found deposited in two red painted buff ware pots, fifteen in one and thirteen in another. The bangles are round and solid in section and have featureless terminals. *100*

Two exquisite necklaces, composed respectively of 173 and 160 beads of semi-precious stones, were found deposited in two red painted ware pots. The necklaces at once recall to the mind the one from Mohenjo-daro (Marshall 1931: Vol. III, Pl. CXLVIII, 6). The beads are mostly long barrels, short bicones and oblates and are made of cornelian and agate while a faceted crystal is also present. Also noteworthy is the discovery of a pot containing over forty thousand micro beads of steatite. All these antiquities were found inside a house which, however, was considerably disturbed. *99* *102*

There is a clear break in the occupation of the site after it was deserted by the people of the Kayatha culture. This hiatus is stratigraphically represented by a compact, sterile layer, about 15 cm thick, the analysis of which by S.N. Rajaguru (personal communication) shows soil characteristics indicating thereby that the site remained unoccupied for a considerable period

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of time after it was deserted by the earliest settlers. But unfortunately, we do not know the cause of the desertion of the site by the people of the Kayatha culture, nor do we have any evidence to show where they went from Kayatha.

The time bracket for the Kayatha culture can be computed on the basis of stratigraphical evidence as also radiocarbon determinations. We have a series of three determinations (½ = 5568 years) from our own dig and some from the earlier excavations (Agrawal and Kusumgar 1969: 4-6). The earliest of these dates is 3965 ± 100 = 2015 B.C. or even earlier, and is helpful in fixing the beginnings of the Kayatha culture at about 2000 B.C. or even earlier. Of the three determinations from our excavations the one from the lowest level is 3830 ± 150 = 1880 B.C. and the remaining two from upper levels are 3785 ± 199 = 1835 B.C. and 3655 ± 95 = 1705 B.C. respectively. All these dates provide us *circa* 2100-1600 B.C., as the time bracket for the Kayatha culture. However, such a wide span is not warranted by the cultural deposit which is hardly a metre in thickness. On the other hand, it should also be borne in mind that there is a clear break in the occupation of the site after the first inhabitants deserted it, and that the period of the succeeding Banas culture has to be fixed at *circa* 1700-1500 B.C. on the basis of evidence from Kayatha and other excavated sites. The wide scatter of dates of the Kayatha culture has, therefore, to be narrowed down and *circa* 2000-1800 B.C. would prove to be a reasonable time bracket. This, of course, is provisional and is liable to be modified when more evidence and new dates become available.

The authors of the Kayatha culture appear to have formed part of the Pre-Harappan or the Early Harappan community if their affinities with the authors of the Sothi culture is any indication. They may have originally been somewhere in south-east Rajasthan from where they perhaps migrated to the adjoining areas of Malwa in the north-western parts of Madhya Pradesh. Malwa is characterized by large tracts of rich black cotton soil and must have, therefore, attracted these early settlers from the neighbouring territory. No conclusions of far-reaching nature can, however, be drawn from the slender evidence furnished by the small scale excavations at Kayatha. More

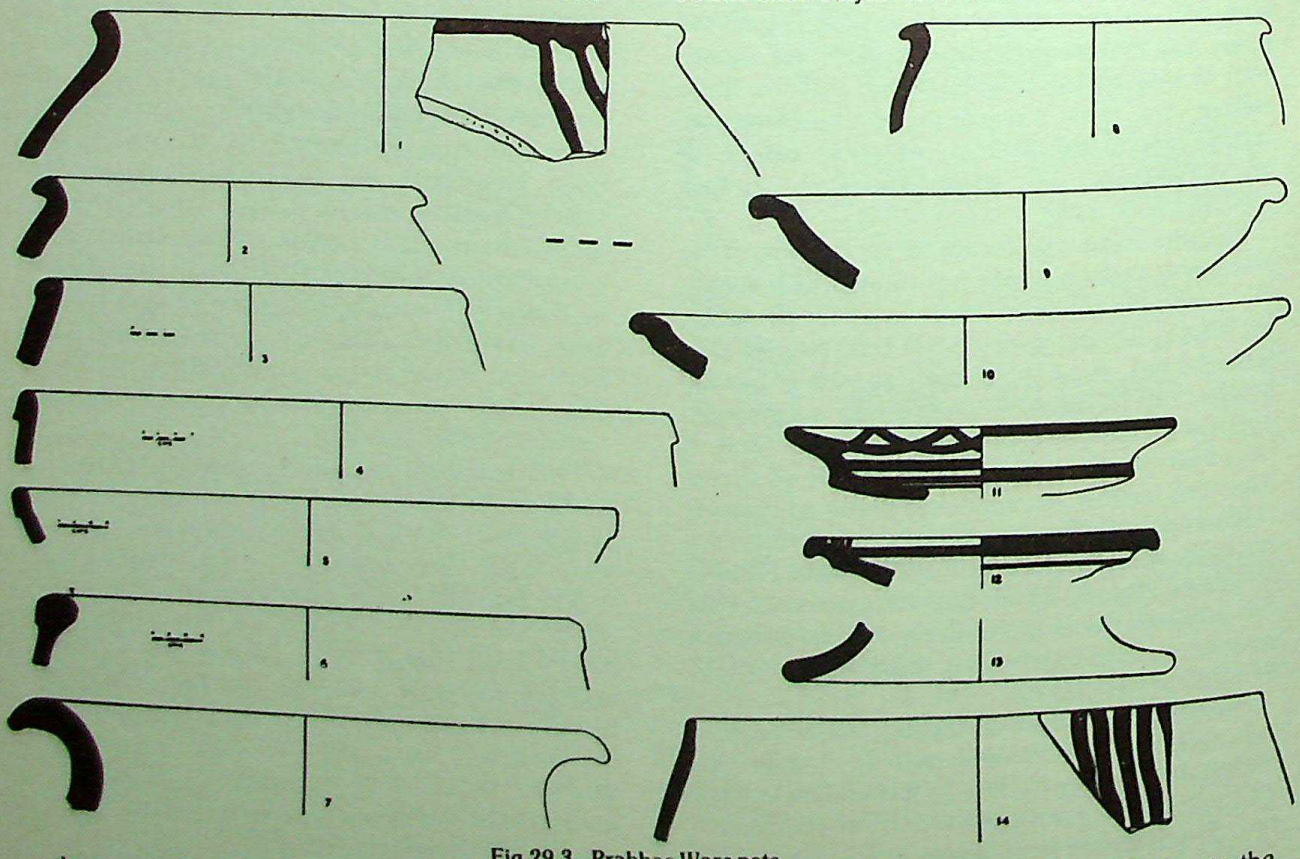


Fig.29.3. Prabhas Ware pots

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

exploration in the Chambal valley and selective excavation can alone throw more light on the culture of the pioneering colonizers of Madhya Pradesh. The explorations in Malwa by Wakankar (1967: 47-52) have brought to light over forty sites of the Kayatha culture; they are mostly located on the Chambal and its tributaries. It is not unlikely that the Kayatha culture may ultimately prove to be the source out of which the Malwa culture was born.

Harappans In Central India

V.S. Wakankar, who has explored a large number of ancient sites in central India, more particularly, in the Malwa region, has discovered a proto-historic settlement in the Chambal valley at Manoti (Dist. Mandsaur, Madhya Pradesh) which, according to him, is purely Harappan (Wakankar 1965: 149-50). The site, though promising, could not unfortunately be excavated on a large scale and the excavation perforce was of a limited nature because the site was to be submerged under the Gandhi Sagar dam on the Chambal. The excavation has brought to light a number of structures in the form of defence walls and platforms built of sun-dried bricks. As in the Indus valley, here too the 'platform-minded' Harappans had built platforms in order to protect their houses from the floods in the Chambal. Wakankar further tells us that in the 1.5 m thick pre-defence deposit he also found typical Harappan material such as the Harappan painted pottery and also a doubtful soapstone seal.

The Prabhas Culture

In western India, Prabhas is a very important Sub-Indus culture. It has been named after the type site of Prabhas Patan or Somnath (Dist. Junagadh, Gujarat) which is situated on the south-western coast of Kathiawar at the mouth of the river Hiran (Hiranya) near the port town of Veraval. The site was first excavated by the late P.P. Pandya of the then Department of Archaeology, Saurashtra State, in collaboration with Late B.Subba Rao of the M.S. University of Baroda in 1955-56 and 1956-57 (*IAR 1955-56*: 7-8 *and 1956-57*: 16-17), and later by M.A. Dhaky of the State Department of Archaeology and R.N. Mehta of the M.S. University of Baroda in 1965 (Nanavati, *et al* 1971). It was again excavated on a large scale by the writer and Z.D. Ansari under the direction of H.D. Sankalia of the Deccan College, Poona, in collaboration with the Department of Archaeology, Gujarat, solely with a view to studying the Prabhas Culture and laying bare the houses of the early settlement at the site.

Our excavations at Prabhas have brought to light a five-fold sequence of cultures which is as follows:

Period I	:	Pre-Prabhas culture (*circa* 2000-1800 B.C)
Period II	:	Early Prabhas culture (*circa* 1800-1500 B.C.)
Period III	:	Late Prabhas culture (*circa* 1500-1200 B.C)
Period IV	:	Early Historic (*circa* 4th century B.C.-1st century A.D.)
Period V	:	Kshatrapa-Gupta (*circa* 1st century A.D.-6th century A.D.)

Of these, the last two periods belong to the historical epoch whereas the first three belong to the Chalcolithic times. The first cultural period is characterized by various ceramic industries of which the most dominant is a coarse grey ware which is decorated with incised patterns which, however, are incipient. This Pre-Prabhas period is dated to *circa* 2000-1800 B.C. in spite of the fact that a single radiocarbon date for a sample of this period would take back its beginning to the middle of the third millennium B.C. (TIFR Date List, Sept. 1972). But there is every possibility of the sample being contaminated by the presence of the miliolite limestone which abounds in the surrounding region and even its large chunks, though few, have been found in the stratum from which the sample for radiocarbon dating was collected. The date provided by us may, therefore, be taken to be fairly reasonable as it has been based on stratigraphical evidence. There is evidence to show that the first settlement of the site was washed away by devastating floods in the river Hiran in 1800 B.C.

The site was again occupied towards the end of the eighteenth century B.C.by a new group of people—the authors of the Prabhas Culture—who flourished at the site for nearly six centuries. It is this period, *circa* 1800 — 1200 B.C., which has been divided into two cultural periods. In fact the pottery, which has been labelled Prabhas Ware, is predominant in both the periods, the only difference being that, during the third cultural period, the Prabhas people come into contact with the Lustrous Red Ware users of Rangpur. It is this element which enables us to divide the entire strata of the Prabhas Culture into the Early Prabhas and the Late Prabhas periods.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Chronology

The Prabhas Culture has been dated from *circa* 1800-1500 B.C. and from 1500-1200 B.C., on the basis of stratigraphical evidence from our excavations. The Pre-Prabhas period which is characterized by the coarse incised grey ware has been dated to *circa* 2000-1800 B.C., because of its association with the Harappan black-on-red painted pottery and segmented faience beads, possibly of Harappan workmanship. The Harappans were flourishing in the Saurashtra peninsula in the first quarter of the second millennium, as is clear from the evidence of excavations at Lothal, Rangpur, Rojdi and such other Harappan sites. The first settlement at Prabhas was washed away by floods, but soon the Prabhas people appear on the scene. The beginning of the Prabhas culture is assigned to *circa* 1800 B.C. and it ends around 1200 B.C. This dating is supported by three radio-carbon determinations which are as follows:

Early Prabhas	
1. PRL - 92 Tr. D6, D7, Stratum (14) (1875 ± 95 B.C). 1974)	(PRL Date list, July (1990 ± 100 B.C.)
2. TF - 1286, Tr. D6, Stratum (13) (Personal communication)	(1646 - 1755 B.C.).
Late Prabhas	
1. TF - 1284, Tr. D6, Stratum (12) (Personal communication).	(1515 - 1755 B.C.)

This would place the beginning of the Prabhas culture even before 1800 B.C. and the transition between the Early and the Late Prabhas to the middle of the second millennium B.C., thus justifying a span of about three centuries for the Early Prabhas period. The Late Prabhas cultural deposit is about a metre in thickness and the time bracket of *circa* 1500-1200 B.C. for it certainly not far off the mark.

Distribution

It is indeed surprising that, in spite of intensive exploration in Saurashtra, only a few sites of the Prabhas culture have so far been discovered. A very important site of this culture is that at Khambhodar, about 15 km east of Porbandar. This is an extensive Harappan site where there is a sprinkling of Prabhas ware. As systematic excavation here would throw welcome light on the relationship between the Harappan culture and the Prabhas culture, planned work at this site will, no doubt, be rewarding. About five kilometres from this site is Kinnarkheda, which is also an extensive Harappan site but considerably ruined. Prabhas ware is present here but in small quantities.

Lakhabaval (Dist. Halar, Gujarat) is located about 14 km north-east of Jamnagar where Prabhas ware was found associated with Harappan in period I (*IAR 1955-56:* 7).

The distribution of Prabhas ware shows how confusing is its occurrence at different places situated far away from each other. It is hard to believe that the culture should have occurred in small pockets in far-off places and be absent from the areas adjacent to the nuclear zone. The recent intensive explorations by Gregory Possehl (personal communication) in the Bhavnagar district have not produced a single shard of the Prabhas ware. It, therefore, appears that the main area of concentration of this culture has, so far, not come to light. Systematic work in the coastal region between Prabhas Patan and Porbandar on the one hand and Prabhas and Rajkot on the other may prove fruitful.

Structures (Warehouse?)

The houses of the Prabhas culture have been uncovered in the course of excavations at Somnath. They are all of stone, set in mud masonry. For *98* constructing the structures, the people of the Prabhas culture used miliolite limestone which is plentifully available in the coastal areas of Saurashtra. The houses of the Early Prabhas period were modest structures, rectangular in plan (3.80 × 2.40 m). An extremely interesting structure complex of the Late Prabhas period was discovered at Somnath in the course of our excavation. It consists of rectangular rooms, some of which are small (1.50 sq. m) and others larger (3.50 × 1.50 m). In most of the larger rooms were found four large flat stones set in mud mortar to form a sort of platform, usually near the entrance. The structure does not have a well made floor—neither postholes, nor any remains of hearth, etc. It does not, therefore, seem to have been used for residential purposes. The only noteworthy antiquities recovered from the structure include a steatite seal amulet, a solitary *101* flake of obsidian and two huge jars of red ware, one plain and the other painted. These artefacts would suggest that the structure may have served as a storehouse. This surmise is strengthened by

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the evidence of a similar structure at Tepe Yahya in Iran which has been identified by the excavator as a storage place (Lamberg-Karlovsky 1972: 179). We have, therefore, tentatively identified the Somnath structure as a warehouse.

Pottery

The Prabhas culture is characterized by its painted pottery **(fig. 29.3 & 4)**. The vessels in this ware are of fine fabric and treated with a pinkish or orange wash which, in several cases, has turned grey because of certain peculiar conditions of the firing in the kiln. Over this are painted patterns in purple or dark brown. The range of painted motifs is extremely limited because they are all geometric such as groups of vertical and oblique strokes, wavy lines, hatched triangles, lozenges, etc. Another noteworthy feature of the Prabhas ware is that the design ornament is usually set in panels or registers **(fig. 29.3/ 2-3)**.

The predominant shape in Prabhas ware is the sub-spherical bowl with a slightly incurved and featureless rim which is sometimes sharpened internally **(fig. 29.3/ 1-3)**. The bowls are in all sizes, small and big, and one wonders why the Prabhas people required such a bewildering variety of bowls. The only possible explanation seems to be that the food they ate must have been predominantly in the liquid or semi-liquid form. This, however, is bound to remain a guess.

Another important shape is a globular jar with globular profile and out-turned rim **(fig. 29.3/ 6-7)**. This obviously may have been a water vessel. These jars too occur in varying sizes **(fig.29.3/ 10-13)**. They usually bear the painted pattern in the upper half of the body.

Two shapes which are evidently borrowed from the Harappans are the stud-handled bowl and the dish-on-stand. The former **(fig. 29.3/ 5)** was an invention of the Harappans in the Saurashtra peninsula and does not seem to have travelled beyond Saurashtra. It is thus, a distinguishing feature of the Indus Civilization as the evidence from Rangpur would show (Rao 1963: Fig. 17, 33). In Prabhas ware the stud handled bowl is adorned with painted designs in panels.

The dish-on stand **(fig. 29.4/ 11-13)**. a characteristic Harappan form, also bears the typical panelled decoration in Prabhas ware. The dish, however, is shallow and does not have the cup-like depression in the centre. The stem is usually solid and is painted with linear patterns.

Cultural Equipment

The people of the Prabhas culture very rarely used stone blades and flakes as tools in spite of the availability of the raw-material in the surrounding region. But they do seem to have been importing obsidian flakes of which a single specimen was in the Late Prabhas levels. It possibly came from Turkey which supplied obsidian to West Asia (Cann *et al* 1971).

Copper implements may have been used on a wider scale for excellent copper ore was available plentifully in the adjacent areas now in Amreli district (Lamberg-Karlovsky 1967: 149). Although only a few bits of copper were found in our excavations, earlier excavations at the sites have yielded a few copper axes (Nanavati, Mehta and Chowdhary 1971: 77, Pl. XI).

The people of the Prabhas culture used beads of semi-precious stones such as chalcedony, cornelian, agate, etc. and faience and steatite as well. Among them the segmented beads of faience are quite common. They were either made locally or were obtained from the Late Harappan traders from Saurashtra. A unique seal amulet of steatite was found in the course of our excavations. It is engraved on both sides, on one side there are seven stylized deer while on the other there are only five deer. Stylistically, the specimen is no doubt related to the Harappan seals. A gold ear ornament was recovered from the Late Prabhas levels. It is floral shaped and is provided with a loop at the back for suspension. It is certainly indicative of the prosperity of the Prabhas people. They also used cubical chert weights identical to those from Harappa and Mohenjo-daro.

End

The Prabhas Culture which flourished for about six centuries dies out without leaving any trace whatsoever around 1200 B.C. However, long before their sudden end, the people of the Prabhas came into contact with the Lustrous Red Ware users of Rangpur. We do not as yet know for certain the cause of the sudden end of the culture, but it may possibly have been due to the increasing aridity in Western India at the end of the second millennium B.C. (Gurdeep Singh 1971: Fig. 2). It was perhaps this famine which led to the destruction of the chalcolithic cultures of central and western India at the beginning of the second millennium B.C.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

The foregoing account shows that our knowledge of the Prabhas culture at present is far from satisfactory. But it can be said with a reasonable amount of certitude that if at all there is any culture which can claim to be the direct descendant of the Harappan, it is the Prabhas culture as its pottery forms, the copper axes, the seals, the segmented faience beads and the cubical chert weights are all unmistakably Harappan. We should therefore agree with S.R. Rao's observations regarding the Prabhas culture:

> The exuberance of evolved Harappan shapes . . . proves that Prabhas did not come under the occupation of the Harappans in the early phase of their settlement in Saurashtra. It is the refugees from the Indus valley or the Gulf of Cambay who came to occupy the site . . . and continued to evolve new traditions ultimately, producing the Lustrous Red Ware as in Rangpur. (Rao 1973: 48).

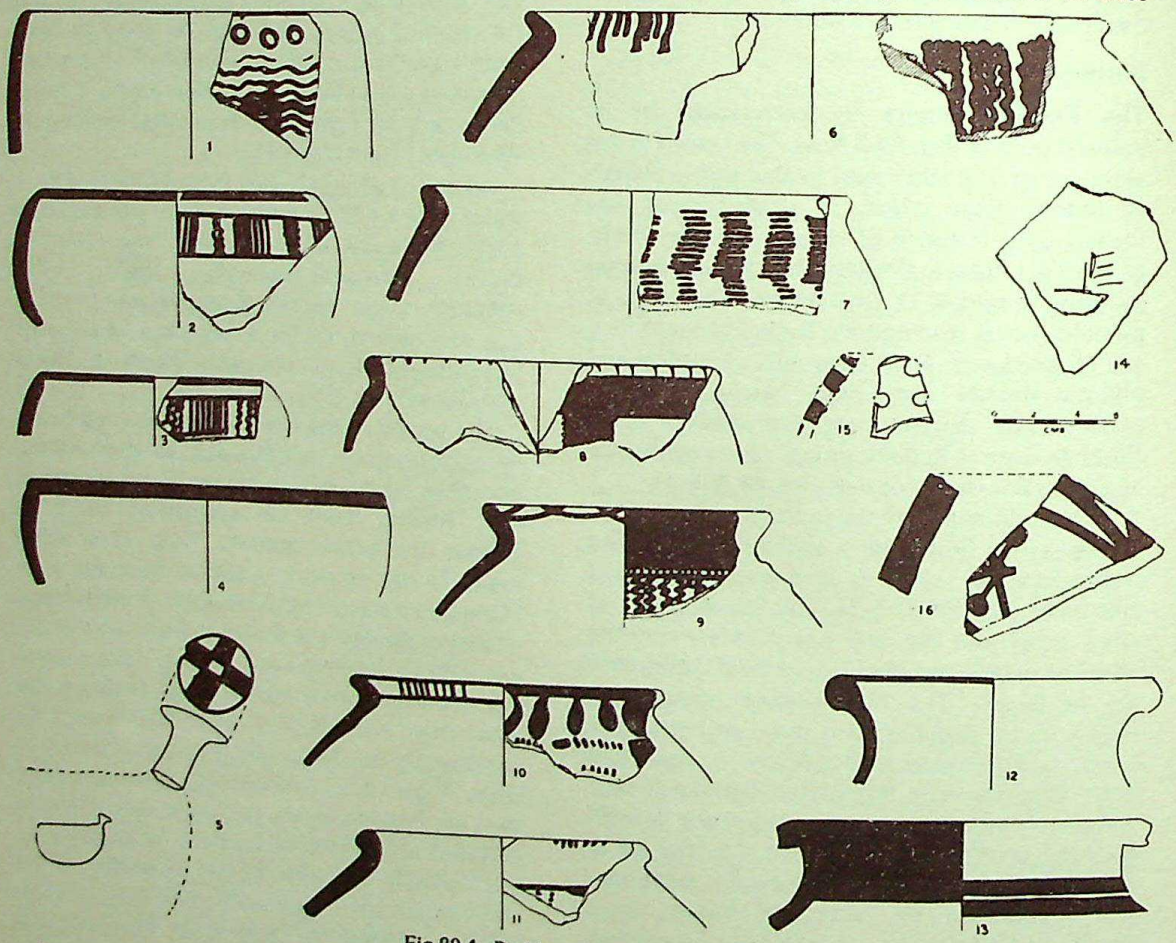


Fig.29.4. Prabhas: Painted pottery

The Sub-Indus Phase in Maharashtra

The southernmost Harappan site discovered so far is Bhagatrao in Gujarat, on the estuary of the Kim, 38 km south-west of Broach. But explorations by S.A. Sali of the Archaeological Survey of India have brought to light a number of sites where Late Harappan or the sub-Indus pottery is found (Sali 1970: 93-101). Of the nearly two hundred sites discovered by him in the Tapti valley, two were occupied only by Harappans whereas at the remaining sites the Harappan—or Late Harappan—pottery was found associated with that from the chalcolithic cultures such as the Savalda, the Malwa and the Jorwe cultures which is indicative of the Harappan occupation. The Harappans may also, therefore, be taken to be the pioneering colonizers in this area. However, only scientific excavation of a few promising sites will prove the precedence of the Harappans or otherwise in the Tapti valley.

Several sites which have yielded only the Late Harappan—Sub-Indus—materials are Dhulia,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Kaothe, Varsus and Bahyana, all in the Dhulia district, Maharashtra. At Hingoni Budrukh was found a Harappan potsherd painted with two characters of the Harappan script. The pottery appears to be similar to that from Period IA of Prakash. Varsus has yielded, besides pottery, a terracotta mask of a rhino like that from Mohenjo-daro (Raghunath 1981: 18). The occurrence of Harappan pottery at other sites in the Tapti valley shows that the Harappans were migrating into the Khandesh region even later during the middle of second millennium B.C., when the chalcolithic farmers were already settled there. There is thus unmistakable evidence of the spread of the Sub-Indus cultures in the Tapti valley from the coastal regions of Gujarat, possibly through the Songadh Pass which even today is the route for the people of both regions.

It appears that the Harappans had also reached as far down south as the Pravara valley. One Shri Deshmukh of the Marathwada University, Aurangabad, brought to our notice an ancient site at Ambhora (Tal. Sangamner, Dist. Ahmednagar). In the course of our explorations at the site, we picked up a number of shards of a thick, sturdy painted black-on-red pottery bearing close affinity with Late Harappan material from the Tapti valley. The associated pottery consists of thick, coarse, red/grey wares and black-and-red ware of thick fabric. An ivory seal, similar to that from Mohenjo-daro (Marshall 1931: III, Pl. CXV, No. 524) was also picked up by S.R. Rao, but the writer however, has had no opportunity to examine it. S.R. Rao confirmed the Late Harappan character of the material later by digging a trial trench at the site. The site unfortunately is now almost completely under cultivation and excavation is therefore ruled out. But the site is not far from Jorwe, the type site of the Jorwe culture, which is just 6 km as the crow flies. Nevertheless, the Harappan affinity of the site would point to the spread of the Sub-Indus cultures to the heart of Maharashtra.

All the evidence discussed above has clearly established the presence of Harappans—Late Harappans—in the state of Maharashtra. That they should have reached so far down south need not be surprising for the historical verisimilitude that can be invoked is that of the refugees from Sind who came to Maharashtra in large numbers consequent upon the partition of the country in 1947.

REFERENCES

Agarwal, D.P. and Kusumgar, S. 1969. Radiocarbon Dates of some Chalcolithic Samples. *Current Science.* Vol. 36, 1; 4-6.

Ansari, Z.D. and Dhavalikar, M.K. 1970. New Light on the Prehistoric Cultures of Central India. *World Archaeology.* Vol. II, 3; 337-346.

Cann, J.R. et al 1971. Obsidian Analysis and Obsidian Trade. In *Science in Archaeology.* Don. Brothwell and Eric Higgs ed. London (2nd rev. ed.) 578-91.

Delougaz, Pinhas 1952. *Pottery from the Diyala Region.* Chicago Oriental Inst. Pub. Vol. LXVIII.

Ghosh, A. 1965. Indus Civilization: Its Origins, Authors, Extent and Chronology. In *Indian Prehistory 1964.* V.N. Mishra and M.S. Mate Poona. 1965. 113-124.

Lal, B.B. 1979. Kalibangan and Indus Civilization. In *Essays in Indian Protohistory.* D.P. Agrawal and Dilip K. Chakravarti ed. Delhi. 65-97.

Lamberg-Karlovsky, C.C. 1967. Archaeology and Metallurgical Technology in Prehistoric Afghanistan, India and Pakistan. *American Anthropologist.* Vol. 69, 2; 145-62.

Mackay, E.J.H. 1929. A Note on a Bas-relief Found at Ur. *The antiquaries Jr.*, 9; 26-29.

———. 1943. *Chanhu-Daro Excavations - 1935-36.* New Haven, Conn.

Marshall, (Sir) John 1931. *Mohenjo-daro and the Indus Civilization.* 3 vols. London.

Nanavati, J.M. 1971. *Somnath 1956.* Baroda.

Raghunath, S.N. 1981. Latest Harappan Post in Dhule Dist. Maharashtra. In *Madhu: Deshpande Fel. Vol.* M.S. Nagaraja Rao ed. Delhi. 17-18.

Rao, S.R. 1963. Excavations at Rangpur and Other Exploration in Gujarat. *Ancient India.* Nos. 18-19, 1962-63; 5-207.

———. 1973. *Lothal and Indus Civilization.* Bombay.

Sali, S.A. 1970. The Harappa Culture as Revealed Through Surface Explorations in the Central Tapti Basin. *Jr. of the Oriental Institute.* Vol.XX, 2; 93-101.

Singh Gurdeep, 1971. The Indus Valley Culture Seen in the Context of Post-Glacial Climatic and Ecological Studies in N.W. India. *Archaeology and Physical Anthropology in Oceania. Vol. VI, 2; 177-89.*

Thapar, B.K. 1967. *Prakash 1955: A Chalcolithic Site in the Tapti Valley. Ancient India.* Nos. 20-21; 19.

Wakankar, V.S. 1965.Comments on A. Ghosh's 'Civilization: Its Origin ....' In *Indian Prehistory 1964.* Misra and Mate ed. Poona. 149-50.

———. 1967. Kayatha Excavations. *Jr. of the Vikram Univ.* Spl No.

Wheeler, Sir Mortimer. 1968. *The Indus Civilization.* Cambridge. 3rd ed.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

30

K.N. Dikshit

Late Harappa in Northern India

The devolution of a civilization would involve in its practical application, the reversal of a few abstract criteria of urbanization as laid down by Childe and discussed by Adams (Childe 1950; Adams 1966). According to Ghosh (1979) Indus de-urbanization involved decrease in settlement size and population, in surplus food production, in cessation of construction of monumental buildings, in use of writing and in long distance trade. All these suggest the weakening of central authority. Lal is of the opinion that a civilization may devolve or deteriorate but its bearers are not normally wiped out. This, however, is precisely what seems to have happned in the case of the Indus Civilization (Lal 1979). Wheeler suggested that the Indus empire was followed by a long phase of cultural fragmentation not altogether unlike from which it sprang but including, perhaps, remoter exotic elements (Wheeler 1966). The material culture also becomes poor when the urban fabric of a culture disintegrates (Gupta 1979). With the decline of this civilization, the sophisticated Harappan traits were watered down by mingling with impoverished local cultures until what was once distinctively Harappan, was diluted to the point of non-existence (Dales 1966). In fact the devolution of a culture appears to be the outcome of economic decline which produces cultural transformation and so changes the internal interaction of the society (Dikshit 1979).

The excavations at Harappa, Mohenjo-daro, Lothal, Kalibangan and a few other sites revealed the salient features of the Indus Civilization **(fig. 30.1)**. In this paper an attempt is made to describe, state-wise, the process of disintegration or devolution of this civilization in northern India. We know for certain that the end was not abrupt and final as thought earlier, but it rolled down and passed on earlier aspects to a subsequent culture which could be called transformation. The Mature Phase degenerated into a well-defined Late Phase. The characteristic aspects requiring detailed discussion include the change in settlement pattern, pottery-forms, minor works of art, trade contacts and disposal of the dead. The cultural gamut of the nuclear region—the Indus Ghaggar Divide —when compared internally, revealed regional variations conforming to devolutionary tendenciese specially in the peripheral region of northern India comprising the states of Jammu & Kashmir, Punjab, Haryana **(fig. 30.2)** and western Uttar Pradesh **(fig. 30.3)**. The area of northern Rajasthan which is an extension of the nuclear region of the Indus Civilization through the Hakra valley or Cholistan area in Pakistan, revealed the remains of only a few Late Harappan sites. The devolution of this civilization in the Indus Valley has not been dealt here.

Recent Field Data

The Harappa culture reached Punjab through the Sutlej river basin. The Sutlej-Ghaggar *doab* has a concentration of such sites, although several sites also lie in a row in the Ravi-Beas *doab* and along the east Bain which joins the Beas. The excavations of a few of these sites revealed three phases of this culture starting from Kotla Nihang Khan, excavated by Vats (1940) and later on by Sharma (*IAR 1954-55*). Other excavated sites include Ropar, Bara (*IAR 1954-55*; Sharma 1979).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Dher Majra (Olaf Prufer 1951), Chandigarh (*IAR 1970-71*; Ghosh 1971), Sanghol (*IAR 1968-69 to 72-73*; Bisht 1976) and Nagar, Dadheri and Katpalon (Joshi 1977). At Ropar, along with the Harappans, an extremely meagre survival of the Early Harappan (after Mughal) or pre-Harappan pottery identified with a regional or rustic variation of Kalibangan I was found. In the later stage, the PGW culture, a new element, was noticed at Dadheri, Nagar and Katpalon. (Joshi 1977).

The Mature Indus complex started in the Punjab at Kotla Nihang Khan where it showed towards the end, a weak overlap with Bara culture in a 1 m thick deposit of typical Harappan pottery.

The site of Ropar, especially its northern mound, was extensively excavated. Recently, Sharma (1979) has summed up Ropar I, as a

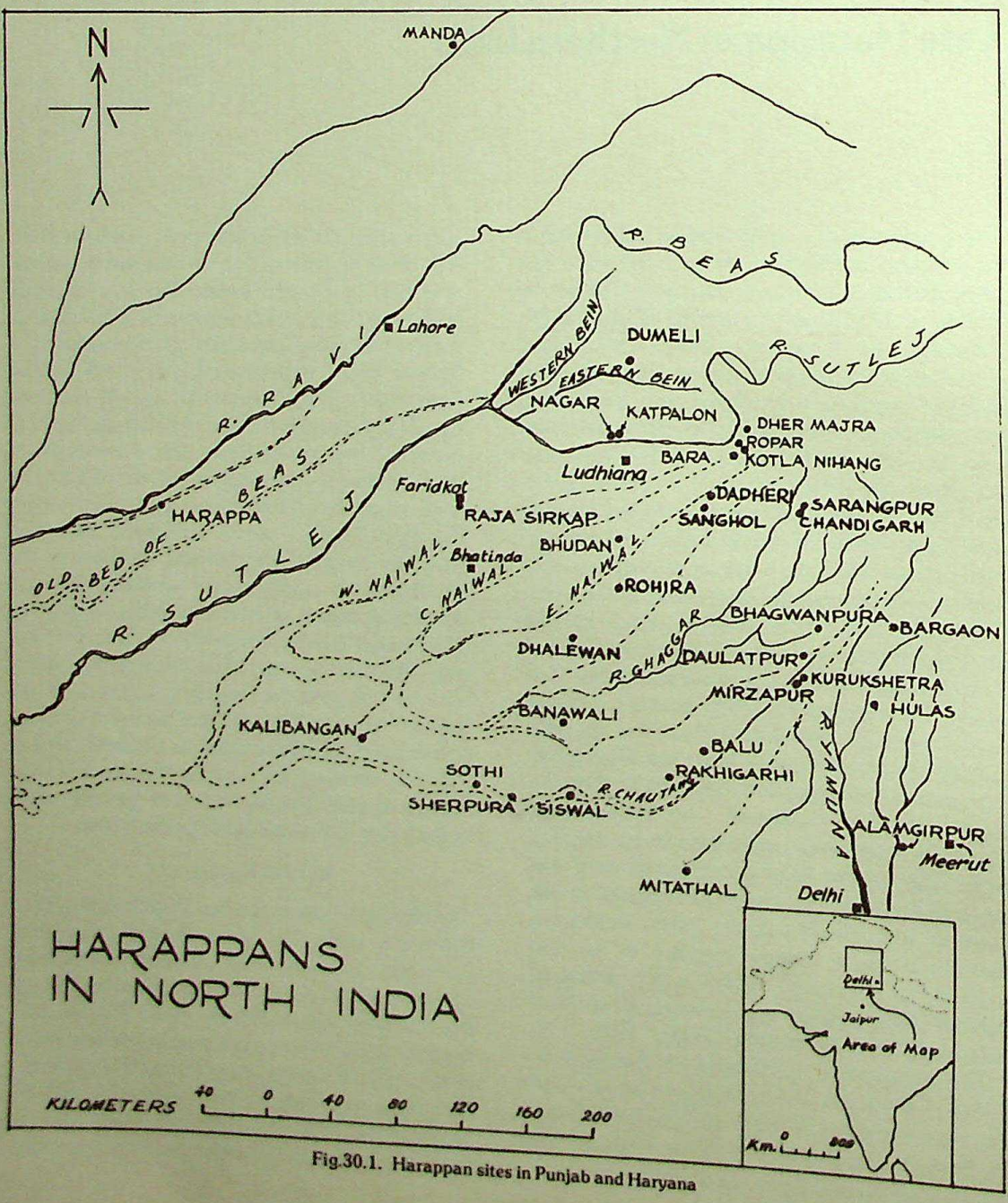


Fig.30.1. Harappan sites in Punjab and Haryana

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

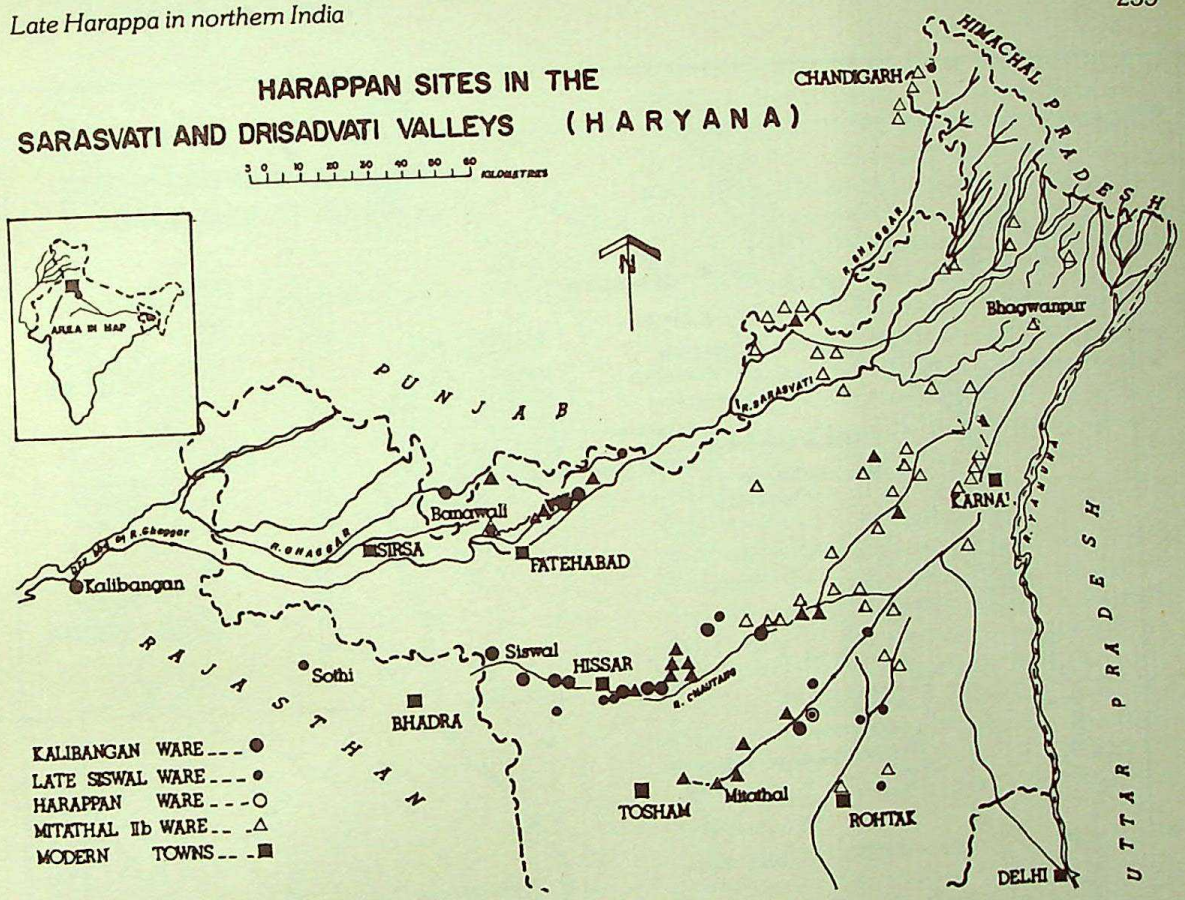


Fig.30.2. Harappan sites in Saraswati system

Harappan period with a predominance of pre-Harappan, Harappan and cognate elements in different levels or areas. These he divided into three phases, A, B, and C, datable collectively to *c.* 2100-1400 B.C. The earliest settlers living on the northern edge of the mound were either pre-Harappans with contacts with the Harappans or a mixed community. The lowest two layers yielded pre-Harappan pottery, particularly examples of fabric A, B and D of Kalibangan and other pre-Harappan sites. As no correlation was attempted between northern side and centre of the mound, or between centre and eastern side of the mound, the proposed sequential chronology is still in doubt. In fact, in the Indus complex, some indigenous traits of unknown connections were always present, although they lacked recognition or some fixed label.

The excavations at Bara, a single culture site, revealed a 4 m thick occupational deposit (Sharma 1979). The pottery is well-levigated, wheel-turned and is having a slip of brownish dull
103 colour with paintings in chocolate or black colour. It is well-known for its exterior incised decoration. Structures were of *kankar* stone and 104
mud-bricks (44×22×11 cm), but hut-dwelling was also practiced. The antiquities included triangular terracotta cakes, bull figurines, bangles and beads; bangles and bracelets of faience, and bangles and fish-hook of bronze. Two indeterminate terracotta objects, about 10 cm high with two bifurcated curved terminals at top and three finger depressions on the front and back were also noticed. Steatite is absent. According to the excavator, the antecedents of this culture can be traced to a pre-Harappan tradition, but unconnected with Kalibangan I. If the results of the excavations on the eastern side at Kotla Nihang Khan, and the northern mound at Ropar, which revealed classical Harappan pottery, without Bara Ware, at the base of both the mounds are any criteria, then the beginning of the Bara Culture cannot be assigned earlier than the classical Harappan phase anywhere in north India.

At Chandigarh no clear-cut stratification was available. In a deposit of 1.50 m typical Harap-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

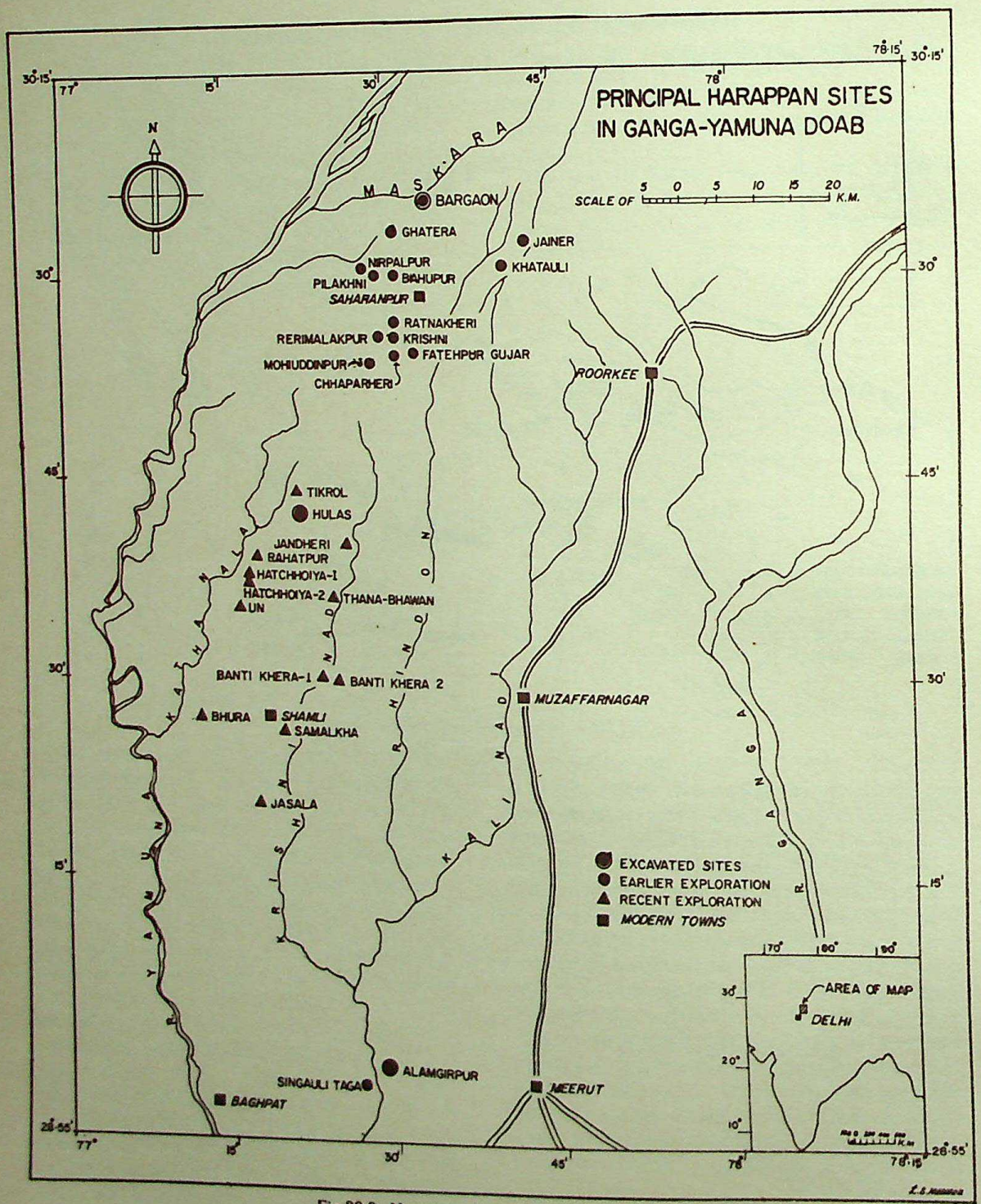


Fig.30.3. Harappan sites in western Uttar Pradesh

pan pottery with designs like the pipal leaf and tree-motif were noticed. Antiquities included terracotta, beads and bangles, bangles of copper and faience and beads of paste and agate. Away from the habitation area lies a cemetry. (Bisht 1976; Lalman 1971).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

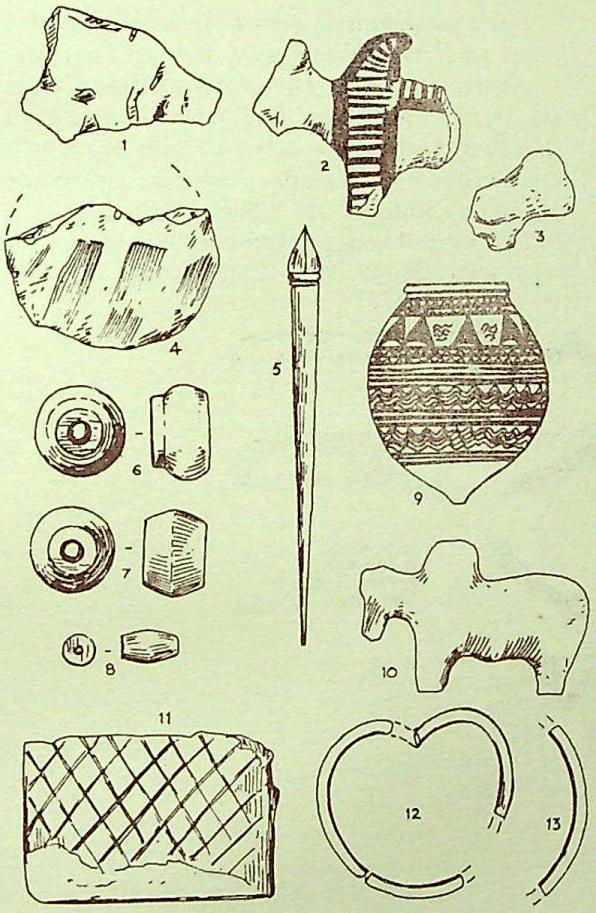


Fig.30.4. Dadheri: Culture-complex

Dher Majra revealed two phases—Late Mature Harappa and Late Harappa conforming to the last phase of Ropar I and Dadheri IA, respectively. In the lower levels on the northern side, a raised mud fortification or dyke was found. The upper phase showed evidence of burial both ordinary and crematory.

In Punjab, Harappan settlements are located at a distance of 8 to 12 km from each other. This spacing conforms well with Gujarat or further east with Harayana or western U.P. In extension, Kotla Nihang Khan measures approximately 260 m east-west, and 100 m north-south (2.60 hectare), Dher Majra—105 m by 90 m (0.95 hectare), and Bara—550 m north-south and 300 m east-west, (16.50 hectare),etc., the mounds at Ropar, Sanghol, Nagar and Katpalon are superimposed by later deposits and the Harappan deposits were encountered only in a limited area, as such their exact extensions of Period I are not known. However, if the site of Kotla Nihang Khan be taken as a case study, it can be said with certainty that most of the settlements must be of average size and smaller in area and population in comparison to their counterparts in the proper Indus valley. The duration of these settlements must be reasonably long as is evident from the occupational thickness at Kotla Nihang Khan which is about 2 m.

No large scale building activity of the Indus Civilization was noticed at any site, including Kotla Nihang Khan where fragmentary walls of standard sized kiln-burnt bricks having as many as four stray structural phases were found. At Dher Majra three bricks of two sizes (30.5×19.5×5 and 28×14×6.5 cm) and a mud fortification were noticed, whereas at Ropar the structure started with mud-bricks, and later of kiln-burnt bricks and also of *kankar* stones. The use of *kankar* as building material in Harappan structures in Punjab appear to have been dictated by local geological formations. Bara people also used *kankar* stone for construction. Sanghol revealed no structures in IA, but in IB, structures of packed clay and mud-bricks (40×20×10 cm), were noticed. The last phase, IC shows an overlap with PGW.

The excavations at Nagar and Katpalon revealed in its lowest level Painted Grey Ware culture interlocked with the Late Harappan. At Dadheri, the period was divided into two subperiods. In period IA Late Harappan Culture was found along with evidence of huts and mud-walled houses over solid rammed mud platforms. Evidence of flood was also recorded. In IB, Painted Grey Ware, Black slipped ware and Late Harappan pottery were found together (**fig. 30.4**). The structures in this period ranged from huts to mud walls and brick-bats and brick jelly revealing two sizes of bricks with finger impression (12 × 12 × 7 and 25 × 20 × 5 cm).

This survey revealed that the Indus people came to Kotla Nihang Khan in the heyday of the Indus Civilization. The cultural retardation which took place due to economic upheaval in the nuclear region was a later event. Ropar and Chandigarh survived as urban-centres but on a small scale, but Sanghol, Dadheri, Nagar and Katpalon were the satellite villages and to expect, in their cultural gamut, urban traits has no meaning. Bara also never achieved urban character and continued only on cultural borrowings.

In Jammu, the excavations at Manda, near

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Akhnoor, on the Chenab also revealed in the lowest level (IA) Indus pottery along with pre-Harappan ones which typologically conform to the Ropar I stage. In the subsequent period (IB) the pre-Harappan element is absent but Harappan ware continued with a new element of grey ware represented by bowls and dishes and thick burnished grey ware. As the area excavated was quite limited, nothing definite can be said about the earliest occupation except that the area of Jammu and Punjab was the centre of increased exchange- activity and growth. Some new elements in the last phase of the Indus Civilization reflect the transformation of the society.

The excavations at Siswal, Balu and Mitathal revealed a culture-sequence starting from pre-Harappan to mature Harappan and late Harappan times. Mirzapur, Daulatpur, Mitathal IIB **(fig.30.5)** and Bhagwanpura IA indicated a general decandence in fabric, potting and treatment of outer surface. At Bhagwanpura IB, the interlocking of Late Harappan culture with PGW was seen (Suraj Bhan 1975; Udai Vir Singh 1977; Joshi 1977).

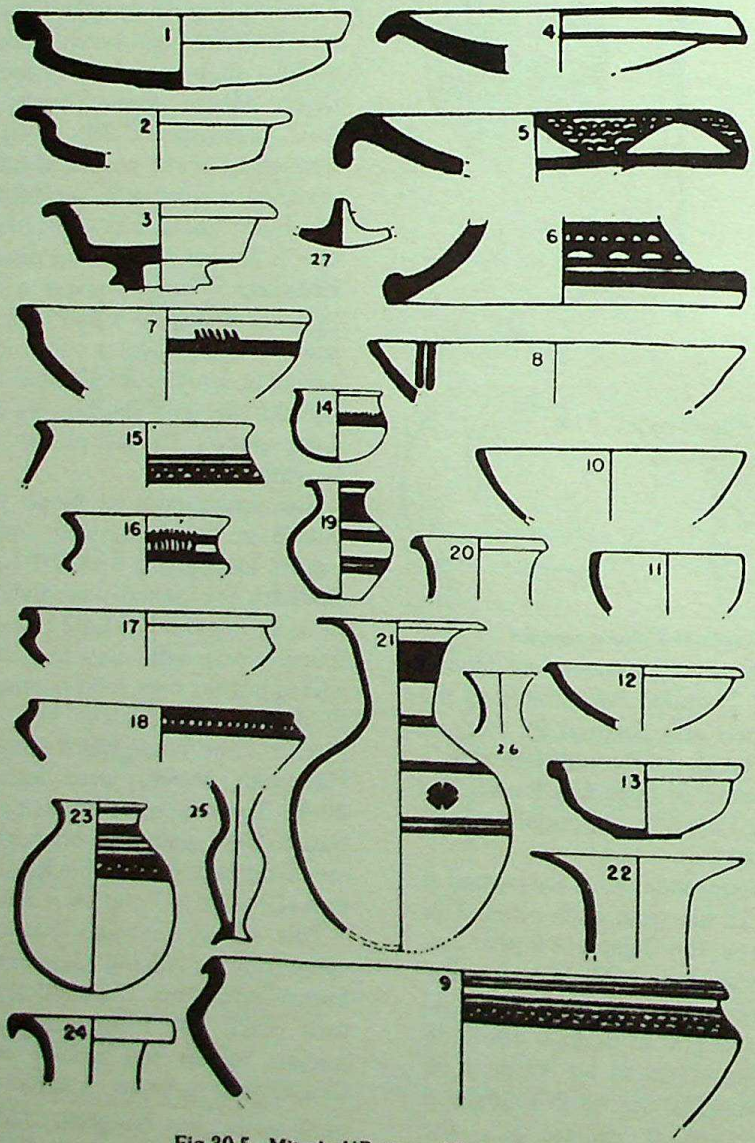


Fig.30.5. Mitathal: Pottery of Period II B stage

The Indus settlements in Haryana range from most extensive sites (Rakhigarhi and Banawali) to the medium (Mitathal IIA) and small-sized settlements (Siswal). The extensive explorations at

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Rakhigarhi revealed a typical dichotomous Indus: Lay-out' citadel on the west and the lower town on the east. At a number of places structures of mud and a burnt-brick platform, an architectural feature of the Indus people, was noticed on the western half of the citadel mound. So is the case with Banawali, another classical Harappan culture site (Bisht 1978). It was a well-planned fortified settlement, divided into two compartments by a massive thick wall, running centrally across the mound. The houses were constructed of mud-bricks but drains were made of burnt-bricks. Three roads, measuring 5.4 m, 5.2 m and 4.6 m in width and a bylane 1.5 m wide, with planned houses having several rooms, kitchen, toilet, etc. were found on either side of the road and the lane. The width of road suggests the volume of traffic in this town. (Bisht and Asthana 1979).

The settlement of Mitathal IIA which is laid on the twin-mound pattern is of medium size in dimension. Mud-bricks were used in structures and no burnt brick was noticed. The presence of a street, about 1 to 1.79 m wide, was also seen. It is better to call it a bylane and not a road as it must have been unable to accommodate the density of traffic through it. The surface treatment of pottery shows decadence. The classical designs are absent. Other settlements of the last category, like Siswal B, which are devoid of urban traits appear to be satellite villages located around the towns or cities.

The excavations at Mirzapur and Daulatpur also revealed, in the lowest levels, remains of the Indus Civilization. At Mirzapur, structures of mud-bricks forming two rooms or single square rooms with a small entrance were noticed. All the walls were straight and met at proper right angles. At this site, except for the typical lay-out of the settlement, all other Indus cultural traits are present. The Daulatpur-complex appears to be slightly later, although steatite beads are present there. The mud-bricks from this site do not conform to Indus brick sizes or ratio (52 × 36 × 10 and 42 × 32 × 7 cm). These sizes of bricks do not even tally with Bhagwanpura IB or Dadheri, where the bricks are quite small. This survey revealed that Mirzapur is earlier than Bhagwanpura IA and Sanghol IA where there are no structures in the early levels and is culturally nearer Mitathal IIA.

The excavations at Mitathal revealed in Phase IIB, the continuation of the mature tradition, but in a transformed manner. The mud-brick structures are no more solid and the beads are not evenly finished. The terracotta biconical variety of beads show typological evolution whereas cart-wheels in this phase are comparatively thicker and smaller in size. The triangular terracotta cakes were replaced by round or oblong varieties. The script is present in the form of graffiti. The Mature Indus culture in Haryana did not end abruptly but slowly assimilated the later traditions and overlapped with Painted Grey Ware.

The excavations at Bhagwanpura **(fig. 30.6)** on the bank of Sarasvati revealed two clear cut stages in its occupational deposit of 2.70 m. In its lowest stage (IA), beakers or perforated jars are

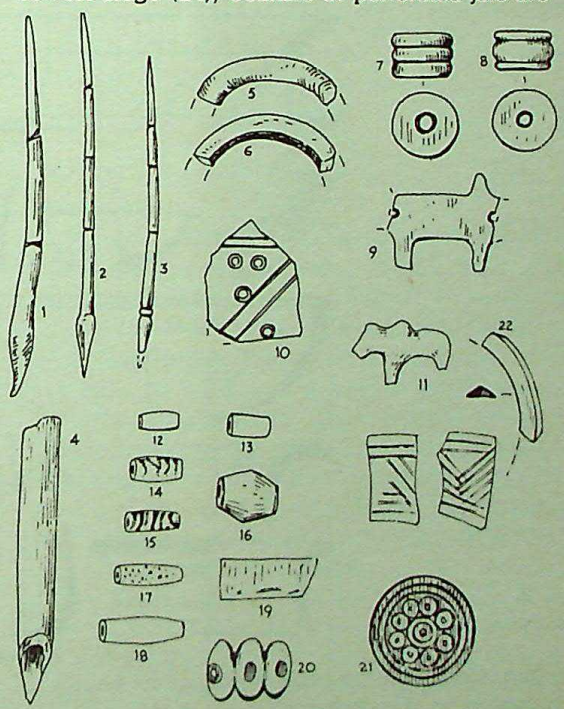


Fig.30.6. Bhagwanpura: Culture-complex

absent in the Harappan repertoire. A solid mud platform, though very small in dimension was also raised as a protective measure against flood. The antiquities included terracotta bulls, cart-wheels with central hub, bangles, copper rods and pins, faience beads and bangles and beads of semi-precious stones and bone pins. This complex continued in the next stage (IB) but with the PGW culture. A planned mud walled house having 13 rooms with a corridor in between and a

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

court-yard on the eastern side was noticed. The Harappan preference for a bath room is absent in this phase. The building material in other structures was mud and also burnt-brick. The sizes of bricks (20 × 12 × 8 · 20 × 20 × 8 and 16 × 12 × 4 cm) are not conforming to Harappan sizes and bespeak some other source of inspiration. This habitation was destroyed by the recurring floods of the Sarasvati river.

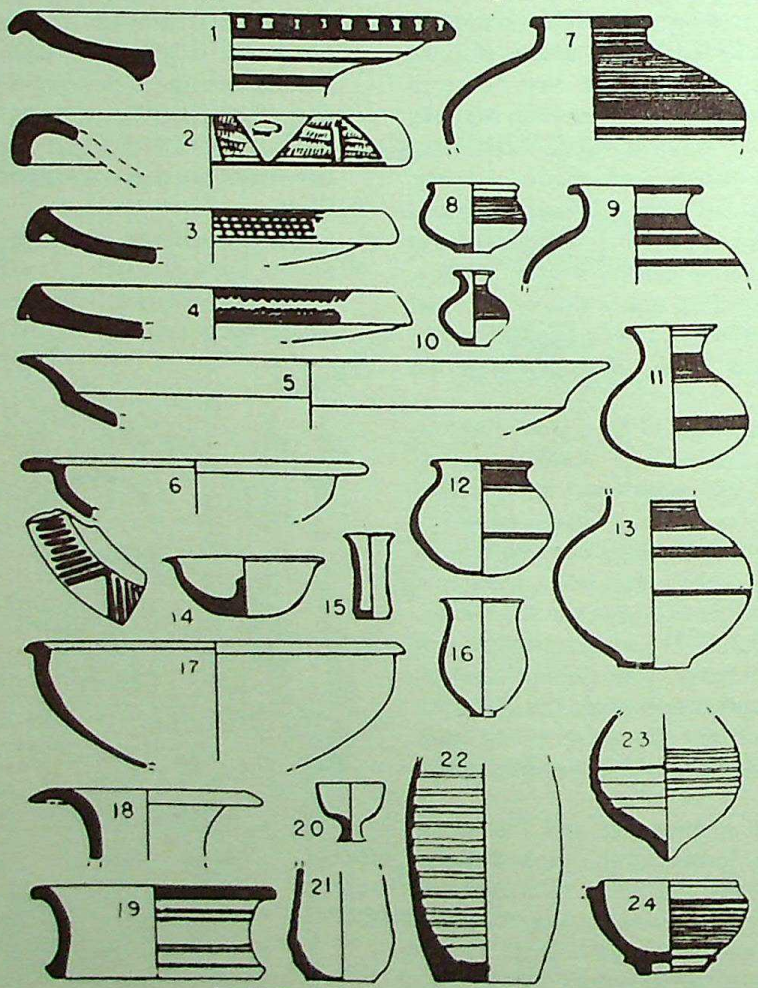


Fig.30.7. Alamgirpur: Painted pottery

In the Gangetic *doab*, the Harappan culture complex at Alamgirpur and Bargaon were found more influenced by the material remains of the Sutlej valley. The extensive or large sites are absent in this region; only medium and small-sized sites are present. More than 75 sites were noticed but, on an average, they are not more than 200 metre in length and 150 metre in breadth, suggesting that the habitations belonged to a small clusters of families. That these sites suggest a linear planning or a nucleated one as worked out by Chitalwala in Saurashtra, is difficult to say (Chitalwala 1979). Most of these sites which are located on the tributaries of the Yamuna and not on Yamuna proper are on higher ground, thus ensuring safety against recurring floods. The construction of a mud-platform, as a conceptual architectural feature of the Harappans, was noticed in the excavations at Hulas and also Jasala (District Muzaffarnagar). One notices pure Harappan sites and also sites mixed with Ochre Coloured Ware (OCW) in the Yamuna valley in the Saharanpur district. The Indus Civilization has completely lost its identity and individuality at Ambkheri, an Ochre Coloured Ware site in the Ganga valley. 121 120 119

Alamgirpur **(fig. 30.7)**, in its occupational deposit of 1.80 m, still preserved some advanced cultural traits like the script, the typical Indus

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

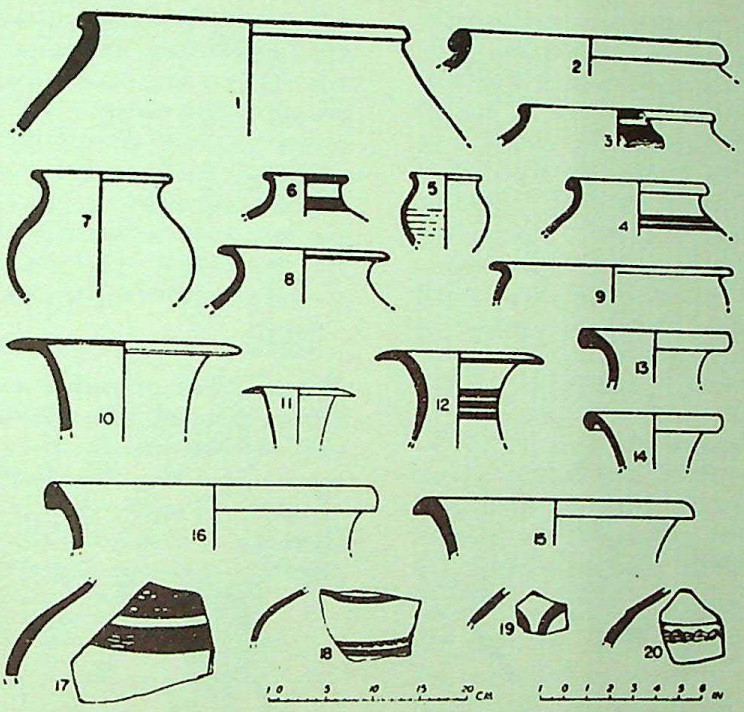


Fig.30.8. Bargaon: Painted pottery

goblet and the perforated jar. However, Hulas also yielded a terracotta inscribed sealing, stray fragmentary burnt-bricks with finger marks but no notable brick-structures. Indirect evidence of hut-dwellings in the form of reed-impressed plaster alone was found. An indeterminate object of baked clay, looking like a brick with two curved ends, with a gap in the middle, noticed at Hulas was also reported earlier from Bara, Chandigarh, etc. At least seven different pieces of this object in various sizes were found at Hulas. The site of Hulas, including successive cultures, measured 330 × 172 m in length and breadth (5.67 hectares). The Harappan habitation may be around 3 hectares.

Alamgirpur and a recently explored site Banti-Khera on the Krishni, a tributary of the Yamuna, appear to be the earliest but coeval with Hulas in this region. Together, they represent the First Phase of the Late Harrappan in Western Uttar Pradesh.

At Bargaon in a 1.20 m thick occupational deposit, the Harappan shapes, including an Indus goblet (?), ring-stand and miniature pedestalled cup **(fig. 30.8)** were encountered (Deshpande 1965). Important antiquities were a fragmentary copper celt and rings, chert blades and weight pieces, a pot with animal headed handle having a perforation in the middle, terracotta and faience bangles, cart-wheels with central hub, and terracotta cakes, round and oblong. No evidence of structure was found. In the adjoining Haryana, at Bhagwanpura, the burnt-brick sizes are not in the ratio of 4:2:1 and steatite is also absent. It therefore appears that Hindon-Krishni-complex of the *doab*, noticed at Alamgirpur and Bargaon is an extension of the Sutlej-complex and may be later than the upper levels of Ropar, since quite a few of the Indus characterisitics show degeneration or are absent in this region.

The Period I of Hulas represented by 1.80 m thick deposit yielded Harappan red ware, besides the associated non-Harappan red and thick grey wares **(fig. 30.9)**. Other finds included terracotta beads, bangles, animal fingurines, a cart-wheel with a raised central-hub and terracotta sealing, faience beads and bangles, agate and carnelian beads, copper bangles, bone points and stone querns and pestles. The oval shaped terracotta cakes with pointed ends and round variety were found. Fragmentary kiln-burnt bricks with husk as degraisant were found inside an oval shaped hearth having a constricted mouth. Mud floorings with burnt-patches and pit-activities were also encountered. In order to keep their settlement intact, a solid mud-platform running in the north-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

east and south-west direction was raised as a protective measure against the floods. In the centre of the mound is a rain gully or ditch separating the Harappan settlement from that of the Painted Grey Ware. The Harappan pottery reported from the ditch look like the Ochre Coloured Ware of this region. This complex has some connection with Sarasvati valley in pottery. Significantly, both the complexes are marked by the absence of beakers and perforated jars and steatite beads and the absence of any form of structures except solid mud-platform. In general, the incised pottery of Bara found with the Harappans in Sutlej-complex is rare at this site (Dikshit 1981).

In Haryana, the Harappans have a closely connected network of towns and villages around them but in Punjab and western Uttar Pradesh, in the absence of large settlements, the situation cannot be viewed in the urban frame-work. The Late Harappan settlements in Haryana and western Uttar Pradesh are located on the tributaries and not on the main rivers. The settlement-pattern of the central Indus Valley of the twin mounds is absent in the Sutlej and Yamuna areas whereas in the Sarasvati and Drishadvati valleys, this pattern continued. However, the lay-out of the Harappan settlements underwent changes and the quality of structures demonstrate a gradual process of degeneration and decay.

POTTERY FORMS

The devolution or gradual transformation of the Indus Civilization from the Mature to the Late is very clear in pottery forms from Manda in Jammu, Dher Majra (**fig. 30.10**), Chandigarh and Sanghol in Punjab, Mitathal IIB, Mirzapur and Daulatpur in Haryana and Alamgirpur, Bargaon and Hulas in western Uttar Pradesh. The painted

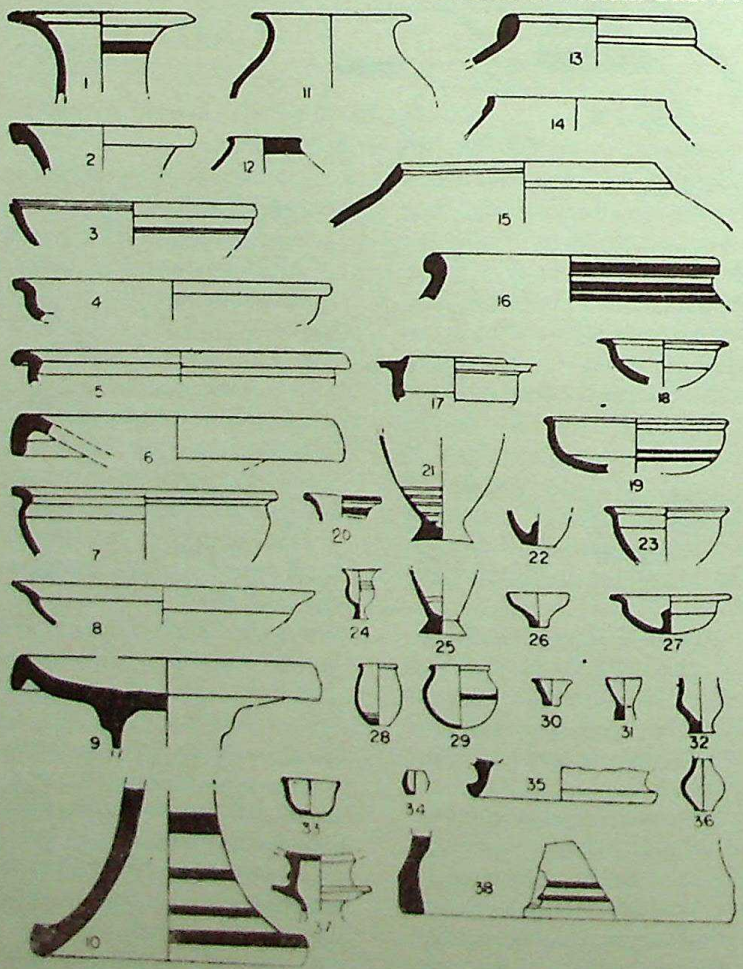


Fig.30.9. Hulas: Painted pottery

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

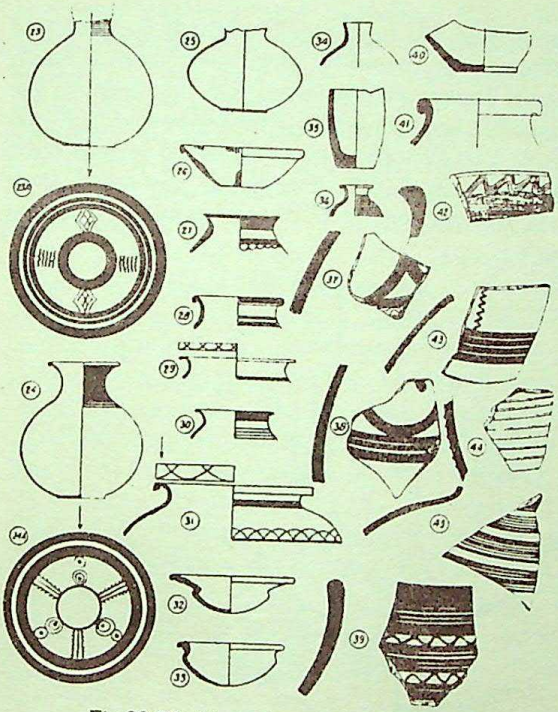


Fig.30.10. Dher Majra: Painted pottery

Harappan pottery in later stage is replaced by less intricate designs and plain unpainted ware with new pot-forms. It appears that, in the later stage of the Indus Civilization, different types of wares such as pre-Harappan survivals, Harappan and also some non-Harappan wares like Cemetery-H and Jhukar coalesced and continued. The famous metallic ring of the pottery is replaced by a feeble echo. The Black-and-red, Painted Grey Ware and grey wares are the new elements found only at a limited number of sites in Jammu, Punjab and Haryana.

The Indus pottery with a generally red surface, is wheel made, although hand-made ware is also available. It is sturdy and well-fired. The clay is well-levigated. The regular striation marks suggest the possible use of a fast wheel. It has sand or lime or both as *degraissants*. The sand often contains a great deal of mica. The majority of pots are utilitarian in character with flat as well as pointed bases. The technique of manufacturing is not very clear. The slip varies from a thin wash to a thick coating, coloured either red or cream. It is generally the upper part of the pots which are covered with slip, whereas the lower portion is left roughened and sometimes found decorated with cord design. A few of the shards also have graffiti marks which also occur on the seals. The fabric is well-known for typical painted designs arranged in horizontal registers on a carefully prepared ground. Complete painted pots are rare. Incised decorations are rare. Cord impressions are met with on storage jars and basins.

In the later stage of the Indus Civilization, pottery which derived its forms and designs from the Mature Phase indicated a general decandence in fabric, potting and treatment of surface. From the Chenab to the Sutlej and the Yamuna, including the Sarasvati and the Drishadvati, characteristic classical forms like the dish with a projected rim and carinated shoulder, a globular vessel with a flange round the neck, a shallow dish with an incurved rim, perforated pots and jar-stands with a concave profile were noticed but in a limited number, whereas a few new forms such as the dish-on-stand with drooping rim, jar with a horizontally splayed-out rim, a medium-sized jar with everted rim, a bowl-like lid with a central knob and a few miniature pots with a ring or pedestalled base were in profusion. The type sites are Ropar, Mitathal, Alamgirpur and Hulas. In the thick grey ware the types are limited. Only basins with an out-turned rim, thick jars with an undercut rim and bowls with everted rims were found. The painted motifs confined to less sophisticated designs from simple bands to triangles and mat designs to intricate ones, including the dancing peacock or crane. The incised decorations are confined to the exterior (Dikshit 1979).

From Kotla Nihang Khan to Hulas, one can see in pottery forms and painted designs, a continuous sequence representing the different stages of cultural development or devolution in this region.

Minor Works Of Art And Craft

The Indus steatite seals and sealings depicting a wide range of animals were found from a number of sites of this civilization at Ropar, Banawali and Rakhigarhi and an unfinished one at Manda. No steatite seal was reported from western Uttar Pradesh. At Ropar, a small steatite seal with Indus Characters and a sealing with impressions of three different seals carrying the bull and inscription were noticed. Except this seal, others found at other sites show a lack of fine execution. The exact details of two seals found at Rakhigarhi (one noticed recently) are not known.

The survey revealed that, in the later period of this civilization, for example at Ropar or for that matter at Hulas, where the Harappan lay-out of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

cities is absent, the seals gradually lost their importance and went out of use. Even at Mohenjo-daro the deftly executed animal figurines are replaced in the Late Phase by cruder ones.

The human terracotta figurines with distinctive head-dress and jewellery found in large numbers at classical sites are rare and absent in later stage sites, handles have small holes. At Bargaon and 111
Alamgirpur, handled pots with animal heads were found. At Mohenjo-daro, the holes in the handles are too small, whereas at Bargaon, the hole is sufficient to allow its being directly hung up in the wall. The Alamgirpur example is more on the pattern of Harappa, than the Bargaon one.

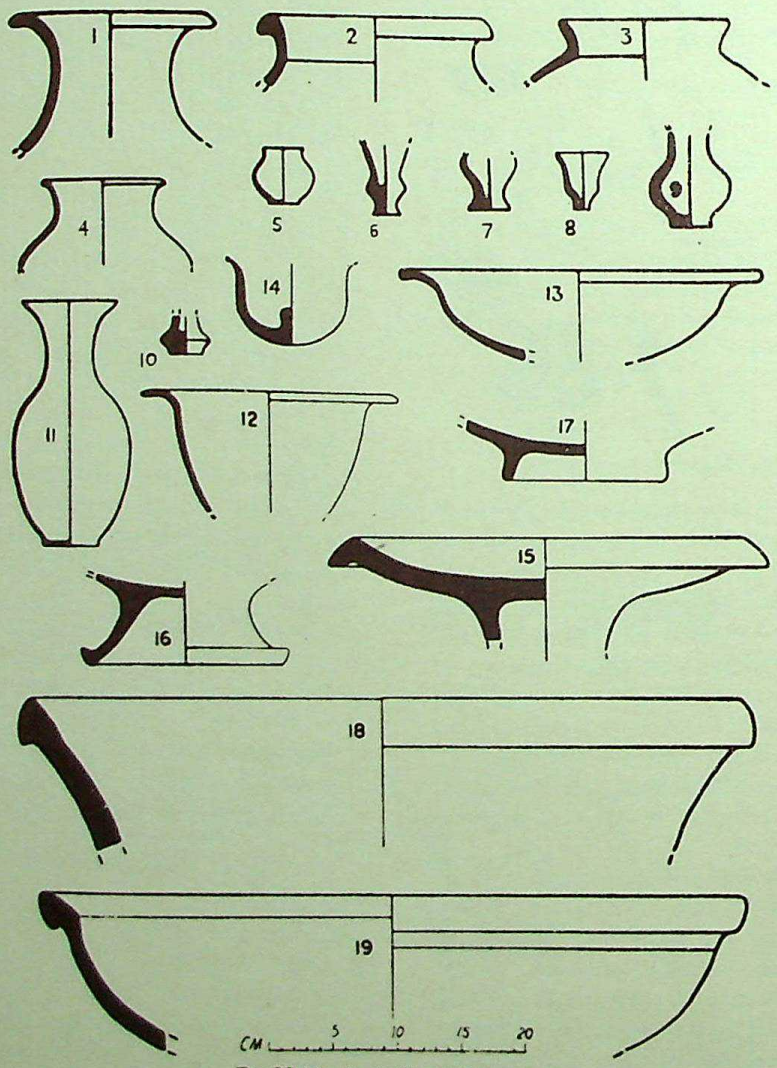


Fig.30.11. Ambakheri: Pottery types

of this civilization, whereas in the case of animal figurines they have undergone considerable change. The triangular variety of terracotta cakes found on Mature Harappan sites is absent in the later stage where the round or oblong variety with finger impressions dominate the scene.

Handled bowls were found at Mohenjo-daro from the middle to the late levels. From other

The parallel-sided chert flakes, often without 112
retouch, and cores from which the flakes were struck were used for cutting or burnishing respectively. Due to use, the edges of the blades have become serrated. In the late phase, the large flakes were dimunative and scarce as one can see in a migratory order at Kotla Nihang Khan, Ropar and Bargaon. Banawali yielded a number of long

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and small blades of chert and other stones, but Mitathal yielded only one chert blade from the surface. At other late sites, the chert blade is conspicuous by its absence. So is the case with chert weights. This shows that the raw material may not have been within the reach of the Late Harappans and trade of this item may not have been lucrative.

The Indus Civilization is well-known for its variety of beads in different materials. Steatite beads, including a painted variety, have the longest duration and vary in size and shape from discs to long cylinders. Long barrel-shaped beads of cornelian were quite popular. Faience was used for beads as also for bangles, balls, miniature pots, etc. When degeneration started, steatite became rare and a few disc-shaped beads were found at Mirzapur and Daulatpur, whereas from other late sites like Sanghol, Bhagwanpura, continue but the majority were small sized, and also not barrel-shaped. In Later Phase, faience was the main material and was even carried over in the overlap phase at Bhagwanpura.

The indeterminate terracotta objects looking like standing bricks with two curved ends having a gap in the middle found at Hulas were also noticed at Bara, Sanghol, Chandigarh, Bhagwanpura and Bargaon. No such object was noticed in Central Indus valley or Rajasthan. *116*

The copper and bronze vessels, alabaster cups and objects of lapis lazuli, shell and ivory are also rare and absent in the later phases. So is the case with copper leaf-shaped knives, thin and flat arrow-heads and other weapons of war, like axes, spears, daggers, bows and arrows, maces and slings. Stone celts are also absent.

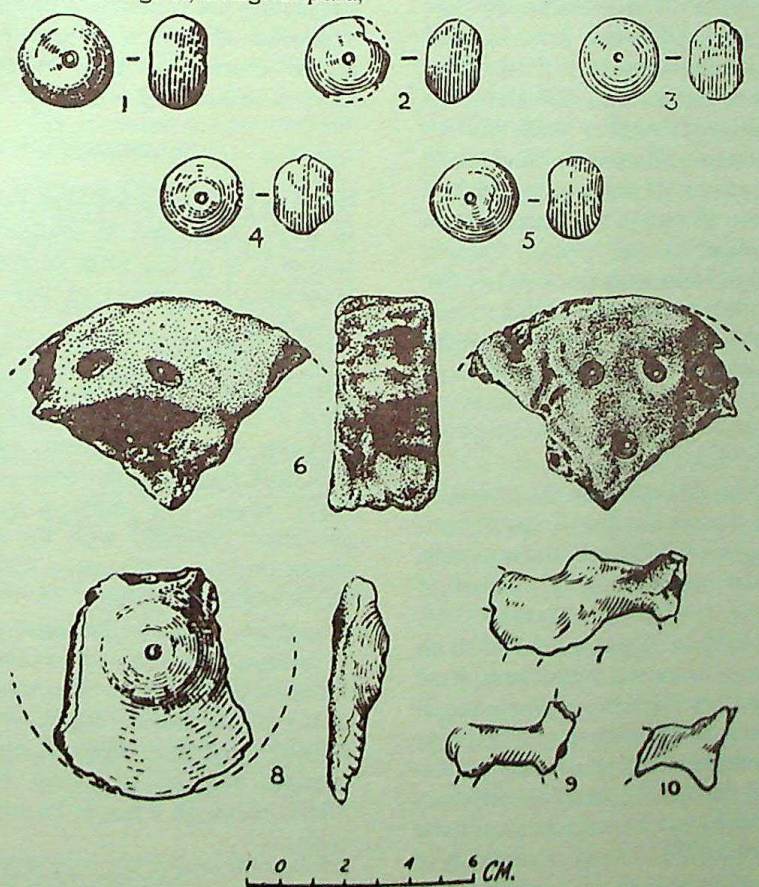


Fig.30.12. Ambakheri: Beads, copper objects, terracotta, etc.

Dadheri, Nagar, Katpalon, Bargaon and Hulas, it is conspicuously absent. Cornelian beads

Disposal Of The Dead

The Indus Civilization is well-known for its

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

cemeteries like R-37 at Harappa, Lothal and Kalibangan. The cemeteries found at Ropar and Chandigarh, slightly away from the habitational areas, were of smaller dimensions. The graves in them revealed typical pots and personal ornaments. The evidence of burials, both ordinary and crematory, was also noticed along with pots at Dher Majra but their details are not known. At Bhagwanpura, two skeletons lying in north-south orientation, with heads towards the north, were found from the habitation area of sub-period IB. There are no funerary goods in the graves.

The presence of skeletons without funerary objects at Bhagwanpura in the habitational area gives rise to new theories. At Ropar and Chandigarh (Lalman 1971), diagnostic Harappan traits survived; so also the custom of a separate cemetery away from the habitational area. At Bhagwanpura IB the Harappan was seemingly supplanted by local cultures and diluted to the point of non-existence. If the classical Harappans were there, the local populace would not have allowed them to break the established conventions and bury their dead inside the house—a practice never followed by them. If the position of these skeletons is accepted, then the question arises—were these people (Bhagwanpura IB) of Harappan stock or not because this change must have occurred due to radically different cultural values. Even the PGW people never buried their dead in the habitational area.

Trade Contacts

The Indus Civilization flourished on the growth of trade by overland sea-routes. Trade was a primary factor in the urban development of societies. In recent years the discovery of a number of Indus artefacts from sites in the Persian Gulf, south and south-east Iran, Afghanistan and south Turkmenia, showing economic interaction, shed valuable light on the trading network prevailing in these regions. However, for understanding it, one must know the resources and mechanism of exchange in each of the smaller geographical units from the Indus to the Gulf, Mesopotamia and the Oxus (Chakrabarti 1977). The alluvial plains of the Indus lacked minerals and materials like copper, gold, lapis lazuli, turquoise, cornelian, and even building timber. All these items, including the essential as well as the luxury ones, were often imported from considerable distances into the cities. The extent of state control on the trade in Indus Civilization is less clear.

The migration of Harappan communities in the Late Harappan phase or even earlier to the foothills of the Himalayas or the Aravallis appear to be related with the exploitation of raw material which must have given rise to short-distance trade. Dher Majra was a factory site for producing a variety of beads in different media and transporting them to neighbouring areas. The plains of the Sutlej and the Yamuna must have opened new vistas for agricultural produce.

In the Late Phase, the trading network collapsed and a cultural void existed. Perhaps trade with the West Asian centres came to a standstill. The absence of certain trade items bear testimony to this fact. This must have resulted due to the rise of insecurity on the trade-routes, thereby suggesting the weakening of central authority, or a process of gradual or slow restrictions on the routes which must have checked the development of commercial enterprise.

Evidence Of Rice

Rice has been reported from Rangpur in the form of husk embedded in mud-plaster, whereas at Lothal it is in the form of impressions of rice-spikelets. The report of rice at Kalibangan is debatable.

The Harappan potsherds and burnt plaster found in the excavations at Hulas and in explorations at Un on Katha Nala (both in western U.P.) revealed traces of rice-husk used as degraissant. The husk had a regular chess-board pattern with wavy rows. The meshes in the husk were stretched vertically with the granules covering major portion of the mesh. On examination, the ornamentation pattern of the husk revealed characters common between the cultivated rice *O. sativa* and the wild perenial *O. rufipogon* (Mittre 1980). The Harappan cultural style underwent a drastic change when the knowledge of rice cultivation opened more southerly and easterly regions to cereal farmers (Fairservis 1967) although it has to be spelled out in clearer terms.

Suggested Dating

The Late Phase of the Indus Civilization does not have sufficient Radiocarbon dates for arriving at any definite conclusion. Bara and Sanghol have provided a set of dates, but the chronological

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

position of Bara is still a debatable issue. The ^{14}C dates of Bara range in time-bracket from 1890 ± 95 to 1645 ± 90 B.C. Bara revealed 14 layers and the earliest date is from the middle level - 9, at a depth of 2.20 m below the surface, thereby suggesting that this site must have been occupied by the beginning of the 2nd millennium B.C. From Sanghol, there are five dates from two trenches. In one of the treches, the dates range from 1900 ± 220 to 1490 ± 130 B.C. and in other one from 1730 ± 220 to 1700 ± 210 B.C. All these samples are from a depth of 3.4 to 5.4 m below the surface. There are no ^{14}C dates from Haryana and western Uttar Pradesh.

Recently, eighteen samples of pottery from Bhagwanpura were subjected to Thermoluminescene dating by the Bhabha Atomic Research Centre, Bombay. The Late Harappan shards occur exclusively in all layers beyond 1.30 m depth. There are 7 dates from the depth of 1.30 to 2.40 m, out of which three TL ages, according to the report, do not conform to the general trend. Other estimates provided a time-bracket between c. 2163 and 1046 B.C. (± an average error of 15%). TL / ^{14}C measurements from Bara, Sanghol and Bhagwanpura have provided a very long time-bracket. Recently, a few samples were collected from Hulas for TL estimation, including samples from the successive PGW horizon. The report is awaited. As no set of dates are available from overlapping stages, nothing can be said about the duration of the cultural continuity or the so-called end of this civilization.

The sites of the Indus Civilization provide in the following order, four different devolutionary stages in the Punjab, Haryana and western Uttar Pradesh:-

A. Early Mature Harappa	— Banawali, Kotla Nihang Khan and Ropar.
B. Late Mature Harappa	— Ropar, Chandigarh, Bara, Mitathal IIA, Mirzapur, Alamgirpur and Hulas.
C. Late Harappa	— Mitathal IIB, Sanghol I, Bhagwanpura IA, and Bargaon.
D. Overlap (Late Harappa–PGW)	— Bhangwanpura IB, Dadheri IB, Nagar I and Katpalon I.

The survey revealed that the typical Indus sites depicting the grand style of the civilization in the time bracket c. 2500-2000 B.C. are generally absent in Haryana, Punjab and western Uttar Pradesh. The sites in the peripheral region from the Early to the Late Mature phases might have been established somewhere between c. 2200-1700 B.C. (Agrawal & Kusumgar 1974). The duration of the sites from the Late Harappan to the overlap stage must be between c. 1700 B.C. and 1000 B.C. or even 800 B.C., because the full impact of iron was not and relative felt in northern India before 800 B.C. This chronology is advanced on an uncorrected ^{14}C dates. With MASCA correction, the dates of the Mature Harappan sites, including those of Central Indus valley would, be elongated.

Discussion

The Indus Civilization did not die a sudden death with the destruction of towns in the central Indus Valley and Rajasthan, but survived for many centuries even outside the Indus Valley in Saurashtra and Gujarat, north Deccan, Malwa, Haryana, Punjab and western Uttar Pradesh. In Gujarat and Saurashtra the Late Harappans established their settlements near the sources of raw materials. So was the case in northern India. At Dher Majra, the major industry was the production of beads in different materials whereas in Haryana, the Late Harappan thrust was to the south, possibly for exploiting copper from Khetri or other adjoining areas and transporting them to other contemporary urban centres. This also gives an idea that the exploitation of traditional mines used by classical Harappans remained no more a lucrative proposition for them, partly because of the deteriorating economic condition in the Indus valley and far-off distances.

The site at Kotla Nihang Khan on the Sutlej, Mitathal (IA) on the Drishadvati, and Hulas on the tributary of the Yamuna, are the excavated type- sites in the Punjab, Haryana and western U.P. The characteristic traits of Kotla Nihang Khan, possibly influenced from Harappa, continued at Ropar, Alamgirpur and Bargaon but in a diminished manner, whereas the cultural gamut of Banawali and Mitathal IA was an extension of the central Indus-Kalibangan-complex which, in time, watered down to a stage represented at Mirzapur, Hulas and Bhagwanpura IA. Which of the group first reached the Ganga valley at Ambkheri **(fig. 30.11 and 12)**, is difficult to outline. However, the presence of these two sets of groups in western Uttar Pradesh open a new area of discussion. Were these groups contemporary or was one earlier than the other? This requires further comparative analysis. In the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Sutlej valley, the stylistic parallels conform to Harappa. In Haryana, the early Mature Phase of the Indus Civilization survived much longer; this being evident from Banawali, Rakhigarhi and Mitathal IA. Later, a stalemate occured. However, in Punjab the Late Mature Phase survived longer and reached Uttar Pradesh in due course of time.

The excavations at Bhagwanpura revealed that the habitational area was subject to frequent floods. Even in the lowest period, it was found that the habitation was built over mud-platforms evidently to save it from the fury of floods. The end or the overlap phase is also capped by floods. Rao thinks that 'the frequency of floods in Bhagwanpura may be one of the reasons why the Late Harappan wares and Painted Grey Ware got mixed up in the deposit. It is desirable to clear the doubt whether the so-called interlocking is real in the cultural sense or accidental due to disturbances of layers'. The evidence from Dadheri, Nagar, Katpalon and Sanghol, according to Rao (1979), is not reliable as the pottery assemblage of the Late Harappan phase may have been water-logged and redeposited. But the excavators do not have such doubts.

The excavators have noticed flood-marks on a large scale but water-logging is mentioned only at Bhagwanpura. Moreover, due to water-logging conditions, the deposit lying immediately on the natural soil will be affected or redeposited. In the zone of extensive canalization like the Punjab and western Uttar Pradesh, the water-table certainly increased. The recurring floods which affected the habitational areas can be explained better, if more areas are tapped horizontally. This is so because the earlier excavations were of a very limited nature, where excepting a few Late Harappan shards, there is nothing Harappan in it. The possibility of encountering an independent phase of the Indus Civilization at Nagar and Katpalon cannot be ruled out, because both the communities would not migrate together and occupy new land.

Sanghol revealed two phases, IA and IB (Bisht 1976). In renewed excavations three phases were made out by the excavator, G.B. Sharma (1979); the last one belonging to the overlap phase. **(fig. 30.13)** A close examination of the materials and section, however, did not confirm the overlap phase.

The so-called end of the Indus Civilization

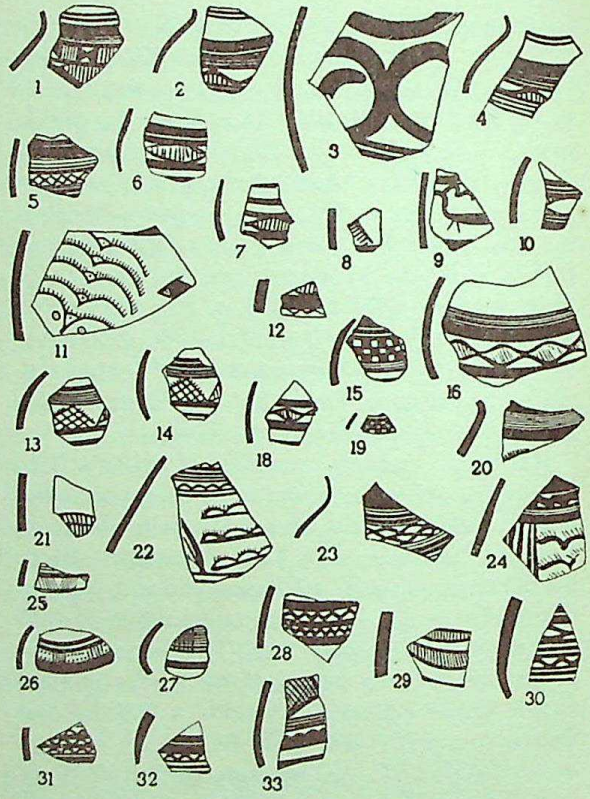


Fig.30.13. Sanghol: Painted pottery

witnessed a general decline in civic standards and also in the disposal of the dead. Cemeteries became smaller. Planned big houses were replaced by the structures of inferior quality generally of wattle and daub. The devolution of the Indus Civilization in Gujarat and Saurashtra and the intrusion of new elements in that complex is an accepted phenomenon, but to outline the precise stage of development and culture transformation in north India is a recent attempt.

EPILOGUE

In the absence of any city or town site of the Indus Civilization in its easternmost zone, Ropar which developed from an advanced village form, appears to be the last medium-sized urban post in the line that controlled internal and external trade relations. The sites, located on the tributaries of the Sarasvati in Haryana and on the Katha Nala, Krishni and Maskara, and all tributaries of the Yamuna in western Uttar Pradesh, confirmed the diffusionary process which spread with regional and local variations, from the Sutlej and the Drishadvati to the Yamuna. The first phase of this movement appears to have been represented at

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Alamgirpur and Hulas.

ACKNOWLEDGEMENTS

I am highly indebted to Mr. M.N. Deshpande, Prof. B.B. Lal, Dr. Y.D. Sharma and Shri G.B. Sharma for their constant encouragement and guidance in this work.

REFERENCES

Adams, Robert Mec. 1966. *The Evolution of Urban Society*. London.

Bisht, R.S. 1976. Transformation of the Harappa Culture in Punjab with Special Reference to the Excavation at Sanghol and Chandigarh. *Archaeological Congress and Seminar*. 1972. Roorki.

Bisht, R.S. and Asthana, S. 1979. Banawali and some other Recently excavated Harappan sites in India. In *South Asian Archaeology 1977* M. Teddie ed. 223-40.

———. 1978. Banawali: a New Harappan Site in Haryana. *Man & Environment*. Vol. II; 86-88.

Childe, Gordon. 1950. The Urban Revolution. *The Town Planning Journal*. Liverpool. 21 April; 3-12.

Chitalwala, Y.M. 1979. Harappan and Post-Harappan Settlement Patterns in the Rajkot District of Saurashtra. In *Essays in Indian Protohistory*. D.P Agrawal and Dilip K. Chakrabarti ed. New Delhi. 113-120.

Dales, G.F. 1966. The Decline of the Harappans. *Scientific American*, May. Vol. 214; 92-101.

Deshpande, M.N. 1965. Comments on A. Ghosh's Paper. *Indian Prehistory, 1964*.M.S Mate and V.N. Misra eds. Poona.

Dikshit, K.N. 1979. The Late Harappan Culture in India. In *Essays in Indian Protohistory*. D.P. Agrawal and Dilip K. Chakrabarti eds. Delhi. 123-33.

———. 1981. The Excavations at Hulas and Further Exploration at Upper Gana-Yamuna Doab. *Man & Environment*. Vol. V; 70-76.

Fairservis, Jr. Walter A. 1967. The Origin, Character and Decline of an Early Civilization. *Novitates*. American Museum of National History, No. 2302. 1-48.

Ghosh, A. 1979. De-urbanization of the Harappa Civilization. *Seminar on Harappan Culture in the Indian Sub-Continent*, Srinagar (in press.)

Gupta, S.P. 1979. The Late Harappa: A Study in Cultural Dynamics. *Seminar on Harappan Culture in the Indian Sub-Continent*, Srinagar (in press).

Joshi, J.P. 1977. Overlap of Late Harappan culture and Painted Grey Culture in the Light of Recent Excavations in Haryana, Punjab and Jammu. *Seminar on the Indus Civilization, Simla* (in press).

Lal, B.B. 1979. The Indus Civilization. *Encyclopaedia of Indian Archaeology*, A Ghosh ed. (in Press).

Lalman. 1971. Discovery of Ancient Chandigarh, *Vishesvaranand Indological Journal*. Vol. IX; Part 20 Sept. 368-73.

Mittre, Vishnu. 1980. Personal communication.

Prufer, Olaf. 1951. Interim Report on the Excavations carried out at Dher Majra. Calcutta.

Possehl, Gregory. 1977. *The End of a State and Continuity of Tradition: a Discussion of the Late Harappans*, Realm and Region in Traditional India. Duke Univerisity. Monograph no. 14; 234-254.

Rao, S.R. 1979. New Light on the post-urban (Late Harappa) Phase of the Indus Civilization in India. *Seminar on Harappan Culture in Indian Sub-Continent*, Srinagar (in press).

Sharma, Y.D. 1979. Harappan Complex on the Sutlej (India). *Seminar on Harappan Culture in the Indian Sub-Continent*, Srinagar (in press).

Singh, U.V. 1977. Late Harappan Culture as revealed by the Excavations at Mirzapur and Daulatpur Districts Kurukshetra (Haryana). *Seminar on the Indus Civilization*, Simla (in press).

Suraj Bhan, 1975. *Excavations at Mitathal and Other Explorations in the Sutlej-Yamuna divide*. Kurukshetra.

Vats, M.S. 1940. *Excavations at Harappa*, Delhi.

Wheeler, R.E.M. 1966, *Civilizations of the Indus Valley and Beyond*, London.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

31

Giorgio Stacul

Harappan Post-urban Evidence in the Swat Valley

Recent field-work at Loebanr III and at Bir-kot-ghundai has provided new evidence on the Black-burnished Ware Period in the Swat Valley (Period IV in the Ghaligai sequence), dated c. 1700-1400 B.C. (Stacul 1969, 1977, 1978, 1979). The settlement pattern, consisting of dwelling and storage pits situated on the hillside overlooking the valley, is one of the main features of this culture. The use of stone-walled rooms in place of dwelling-pits is noticed in the late occupation layers of the same period. Botanical and faunal remains gave evidence of a developed agriculture and of cattle-breeding combined with pastoralism (Costantini 1979; Compagnoni 1979). Besides stone and bone polished tools, the use of copper, gold, shell and faience objects is also noticed. The pottery is characterized by three main wares, which seem to correspond to different cultural components:

(1) Brown to grey gritty ware, turned on a slow wheel, represented by shapes and features derived from the previous period (such as the ovoidal jars with mat-or basket-impressions on the base).

(2) Black-grey burnished ware, generally turned on a slow wheel (it is wheel-turned in a few samples only), characterized by a large variety of shapes, some of which show close affinities with black burnished types of vases common in the northern Iranian plateau during the third millennium B.C. and later (bowls-on-stand, carinated bowls, deep open bowls, etc.).

(3) Black-on-red painted and wheel-turned ware, whose shapes, decorative patterns and incised pot-marks show close links with the Indus Civilization during the early post-urban period.

From Period II of the Ghaligai sequence, dated to the second half of the third millennium B.C., the black-on-red, wheel-turned ware is evidenced in the Swat Valley. The excellent quality of this pottery, well-baked and finely textured, suggests its connections with a culture very close to the Harappan or Indus Civilization (Stacul 1969).

This cultural horizon completely disappears in the subsequent Period III, dated to the beginning of the second millennium B.C. and characterized by coarse hand-made vases with mat-or basket-impressions on the base.

New evidence of black-on-red painted ware has been brought to light at some settlements belonging to Period IV in the Ghaligai sequence as Loebanr III and Bir-kot-ghundai. Some shapes seem to have been derived from the red ware common at Ghaligai in late Period II, such as the open bowls, the stemmed bowls and the large conical pedestals. The cord-marked impressions and the vertical burnishings represent a possible link too (Stacul 1969: figs. 29, 30). However, there are some remarkable new features, consisting of geometrical decorative motifs such as comb-patterns **(fig. 31.1: 3)**, chequers, stars **(fig. 31.1: 15 and 18)**, as well as floral and faunal representations such as pipal leaves **(fig. 31.1: 18)**, four-petalled rosettes **(fig. 31.1: 13)**, cattle **(fig. 31.1: 6)**, peacocks **(fig. 31.1: 1)** and other birds **(fig. 31.1: 5, 7, 8 and 9)**. In this assemblage, a human-like figure near a disc-tipped cross is also represented **(fig. 31.1: 19)**.

Some painted patterns such as pipal leaves or a tree **(fig. 31.1: 18)** and the four-petalled rosette

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

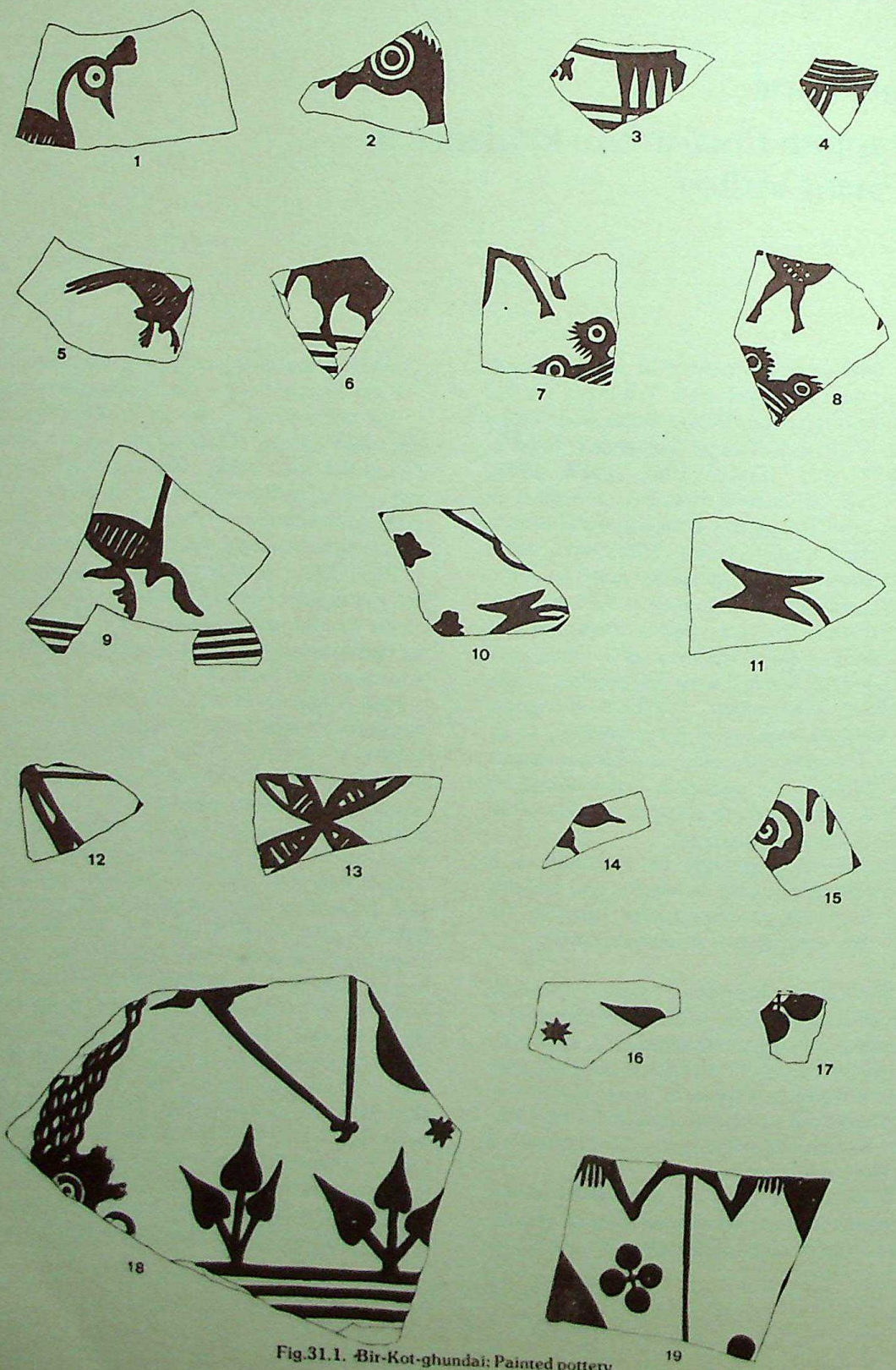


Fig.31.1. Bir-Kot-ghundai: Painted pottery

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

or intersecting circles **(fig. 31.1: 13)**, clearly recall the Harappan painting tradition, where similar motifs were probably attributed with a particular meaning (Wheeler 1947: pls. XLVI and XLVII). Incidentally, the pipal leaf is mostly recorded on pottery from Mundigak IV (Casal 1961: fig. 65).

Other designs may be compared rather with patterns connected with the so-called culture of Cemetery H. We refer to the stars **(fig. 31.1: 16)**, the birds' heads like multi-rayed sun-motifs **(fig. 31.1: 7 and 8)** (Vats 1940: pl. LXVI, 82), the double-axe shaped leaves (?) **(fig. 31.1: 10, 11)** (Vats 1940: pl. LXVI, 86), the wavy pattern and the chain produced by entwining the wavy lines **(fig. 31.1: 18)**. The spiral motif **(fig. 31.1: 15)** shows affinities with a pattern common in the Bara assemblage (Sharma 1971-72: fig. 10, no. 17).

More evidence for the relation with the Indus valley in the post-urban period is provided by the occurrence, at Bir-kot-ghundai in particular, of some types of faience beads showing solar or astral symbols, such as (1) a quadrifoliate type with four or five dot-centred circles, and (2) a star-shaped type with dotted circles at the centre (Stacul 1979: figs. 19, 20). The last one recalls a motif very common on pots and lids of Cemetery H (Vats 1940: pl. LXIII, 4, 12, 14; pl. LXIV, 10; and LXV, 26-29).

However, it may be observed that some of the designs described are not a mere imitation of, or derivation from, the well-known stylized patterns common in the western plains of the subcontinent. The careful finishing of some animal figures, such as cattle and birds **(fig. 31.1: 5, 6 and 9)**, suggests a direct and keen observation of nature. The naturalistic treatment of these representations, which does not stand comparison with the schematic stylization on the Harappan and post-Harappan pottery, supposes a particular, well-developed regional style.

It may be assumed that the makers of this beautiful painted pottery cannot be confined to the hilly area of Swat and the surrounding valley. However, the geographical distribution of this pottery and style is still an open question. In the light of present evidence, 'we see no appreciable signs of Harappan penetration in the Western Punjab and up on the direction of the Khyber Pass' (Dales 1968: 15). The main archaeological gap is represented by the Gandhara plain, which connects the Indus Valley to the north-western hilly regions.

With regard to the chronology of this ware, some typical decorative patterns such as pipal leaves and intersecting circles show that the Harappan painting tradition already survived in this cultural assemblage. On the other hand, the occurrence of solar or astral symbols such as stars, stars with dot-centred circles, multi-rayed sun-motifs, etc., emphasize the connection with a post-urban culture very close to that of Cemetery H.

The geographical extent of this pictorial style and the connected ideology are still matters for discussion. According to Wheeler, the Cemetery H people produced a painted pottery which is essentially distinct from that of the Harappans (Wheeler 1966: 84). Other scholars have noticed that at Iranian sites, such as Tepe Giyan (layers II–III), Djamshidi II and Susa D, painted stars and birds occur in register in a manner strikingly recalling that of Cemetery H (Allchin 1968: 149).

If so, it may be assusmed that around the middle of the second millennium B.C., two different cultural waves reached the Swat Valley from the Iranian plateau. (1) A northern wave, distinguished by the black-burnished ware, originally connected with the culture of sites like Tepa Hissar, Shah Tepe, etc. (Stacul 1970; Mughal 1977: 70–72). The Kashmir Valley (Burzahom Phase II) seems to represent the easternmost limit of diffusion of this stylistic horizon. (2) A southern wave, characterized by a painted pottery decorated with birds and various astral motifs, which seems to have reached the Swat Valley after its integration and fusion with the Late Harappan Culture.

The independent spreading of the aforesaid waves in the Swat Valley seems to be shown by the particular shapes, fabric and distribution-area of the black-burnished and red-painted wares respectively. The comparatively large amount of black-on-red painted ware at Bir-kot-ghundai (where it represents about 20 per cent of the pottery found, in comparison with 3 per cent at Loebanr III) suggests the possibility that this site could have represented a sort of trading-post, closely connected with peoples living in a surrounding area, probably in the Gandhara plain country.

During the same period, the Swat Valley seems to have been reached by a third cultural wave too, moving southwards through the great mountain chain. It is noticeable in the occurrence of various finds such as jade beads, rectangular

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

holed knives or harvesters, holed stone axes, miniature holed axe-like amulets and polished bone pins with heads shaped like a tao-t'ieh mask (Stacul 1979: figs. 10, 11, 16 and 17). All these features suggest a sort of influence from northern China, and this also seems to be evidenced in the Kashmir Valley by other finds reported from the same period and somewhat earlier (Thapar 1965: 93; Gupta 1979: 301-303).

Particular attention may here be drawn to a singular painted representation from Bir-kot-ghundai, consisting of a stylized human-like figure near a disc-tipped cross **(fig. 31.1:19)**. In northern China, similar human-like representations close to astral symbols occur on pottery assigned to the Ma-ch'ang stage of the Yang-Shao Culture (Anderson 1943: pls. 190, 191).

At the present state of research, it is possible to remark that the Swat Valley represents the northernmost limits reached by a post-urban Harappan culture in the subcontinent. This cultural complex, dated around the middle of the second millennium B.C. very probably shows a transitional phase between the Harappan culture and that of Cemetery H. The association of black-on-red painted ware, black-burnished ware and some other bone and stone objects which have been mentioned above, seem to evidence long-distance trading routes which connected the Swat Valley with other countries during this period.

The disappearance of these foreign traits—with the exception of the northern Iranian influences—corresponds to the spreading, in a large area of the subcontinent, of a very homogeneous and well-developed culture, evidenced by a large number of settlements and graveyards, which is distinctive of Period V in the Swat Valley (*c.* 1400/1300-800 B.C.). This culture, as well as those which followed it up to historical times, marked a process of isolation from the great river civilizations and the connected trade-circuits (Tusa 1979: 681).

Fig.31.2. Bir-Kot-ghundai: Horse motif

POST-SCRIPT

During the excavation season 1981, a black-on-red painted potsherd with a horse representation has been recovered in a layer of Period IV (1700-1400 B.C.) at Bir-kot-ghundai **(fig. 31.2)** which is obviously of great significance in terms of migrations.

REFERENCES

Allchin, B. and Allchin, R. 1968. *The Birth of Indian Civilization.* Hammondsworth.

Andersson, J.C. 1943. Researches into the Prehistory of the Chinese, Bulletin of the Museum of Eastern Antiquities. 15.

Casal, J.M. 1961. *Fouilles de Mundigak.* Paris.

Compagnoni, B. 1979. Preliminary Report on the Faunal Remains from Proto-historic settlements of Swat. In *South Asian Archaeology 1977;* M. Teddie ed. Naples. 697-700.

Constantini, L. 1979. Notes on the Paleoethnobotany of Protohistorical Swat. In *South Asian Archaeology 1977;* M. Teddei ed. Naples. 703-708.

Dales, G.F. 1968. Of Dice and Men. *Journal of the American Oriental Society.* Vol. 88; 1; 14-23.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia, and the Indian Borderlands.* Vol. II. Delhi.

Mughal, M.R. 1977. Cultural Links between Pakistan and Iran during the prehistoric period (5000-1000 B.C.). *Iran Pakistan — A Common Culture.* Islamabad.

Sharma, Y.D. 1971. Notes. *Puratattva,* No. 5; 41-20.

Stacul, G. 1969. Excavation near Ghaligai (1968) and Chronological Sequence of Protohistorical cultures in the Swat Valley (West Pakistan). *East and West.* Vol. 19; 44-91

———. 1970. The Gray Pottery in the Swat Valley and the Indo-Iranian Connections (*c.* 1500-300 B.C.). *East and West.* Vol. 20; 92-102.

———. 1977 Dwelling- and Storage-Pits at Loebanr III (Swat, Pakistan) 1976 Excavation Report. *East and West.* Vol. 27; 227-253.

———. 1978. Excavation at Bir-kot-ghundai (Swat, Pakistan), *East and West.* Vol. 28.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

———. 1979. The Black-burnished Ware Period in the Swat Valley (c. 1700-1500 B.C.). In *South Asian Archaeology 1977*. M. Taddie ed. Naples. 661-673.

Thapar, B.K. 1965. Neolithic problem in India. In *Indian Prehistory: 1964;* V.N. Misra and M.S. Mate. ed. Poona; 87-94.

Tusa, S. 1979. The Swat Valley in the 2nd and 1st Millennia B.C.: A question of marginality. In *South Asian Archaeology 1977)*. M. Taddei ed. Naples. 675-695.

Vats, M.S. 1940. *Excavations at Harappa*. Delhi.

Wheeler, R.E.M. 1947. Harappa 1946: The Defences and Cemetery R-37. *Ancient India*. No. 3; 58-130.

———. 1966. *Civilization of the Indus Valley and Beyond*. London.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

32

Walter A. Fairservis

Archaeology in Baluchistan and the Harappan Problem

Baluchistan is often referred to as the Indo-Iranian borderland and is perhaps in the present context more accurately known by that name. Its physiogeographical extent does exceed the political boundaries often used to define the region. Located at the south-eastern rim of the larger Iranian basin, it is characterized by a great depression, the Mashkel, at its centre, with a surrounding series of mountains, hills, and valleys around its rim forming a sub-basin within the larger Iranian Tertiary system. On the south, the coastal ranges of the Makran form a series of east-west trending valleys that merge with those of south-eastern Iran in what is known as Iranian Baluchistan. In the north, the Chagai hills divide the Mashkel system from the Helmand river valley and its Seistan delta which centre in the *Registan* Dasht-i-Margo sub-basin of southern Afghanistan. On the north-east, the line of the Gomal river valley has traditionally separated Baluchistan from the north-west frontier districts of Pakistan. The clearest geographic division of Baluchistan from southern Afghanistan occurs in the separation of the Gomal's drainage system from that of the Tarnak-Arghandab-Helmand system. The Gomal system includes the Kakar hills and the Zhob river valley.

Geography

On the east, the Indo-Iranian borderland is marked by the ranges of the Sulaiman mountains (and the Bugti hills) on the north, and the Kirthar on the south. Both of these mountain-chains loop around the broad alluvial plain of Kachhi, converging in the Bolan Pass-Quetta area. These mountain systems form, however, the western boundaries of the Indus valley proper. If one includes the debouchment of the Gomal river near Dera Ismail Khan, the borderland physiographic zone includes the whole of the Derajat from Tank to Dera Ghazi Khan that lies 305 m above sea level. The Kirthar in turn includes the Bandhni Nai drainage south of Lake Manchhar and the Kohistan just north of Karachi. In all, the area involved is about 5,18,000 sq km (including Iranian Baluchistan) **(fig. 32.1)**.

The river-valleys of Baluchistan are rarely perennial, the exceptions being the Porali river and the Hab on the south-east and perhaps the Zhob river on the north-east. The rest of the major river systems are generally seasonally active and provide moisture for crops only with manual help. Among these are the Pishin Lora north of Quetta, the Anambar south of Loralai, the Rakhshan in Jhalawan, and the Dasht on the west of Makran.

The climate is generally arid, the annual rainfall being below 25 cm. However, within this situation there are significant differentials. The higher regions from Kalat city north and east to the Zhob valley receive winter rains with some regularity. The southern and western regions, however, such as Las Bela and Makran, are part of the summer monsoonal system and receive but little regular coastal rainfall owing to their location at the penumbra of that system.

Fauna

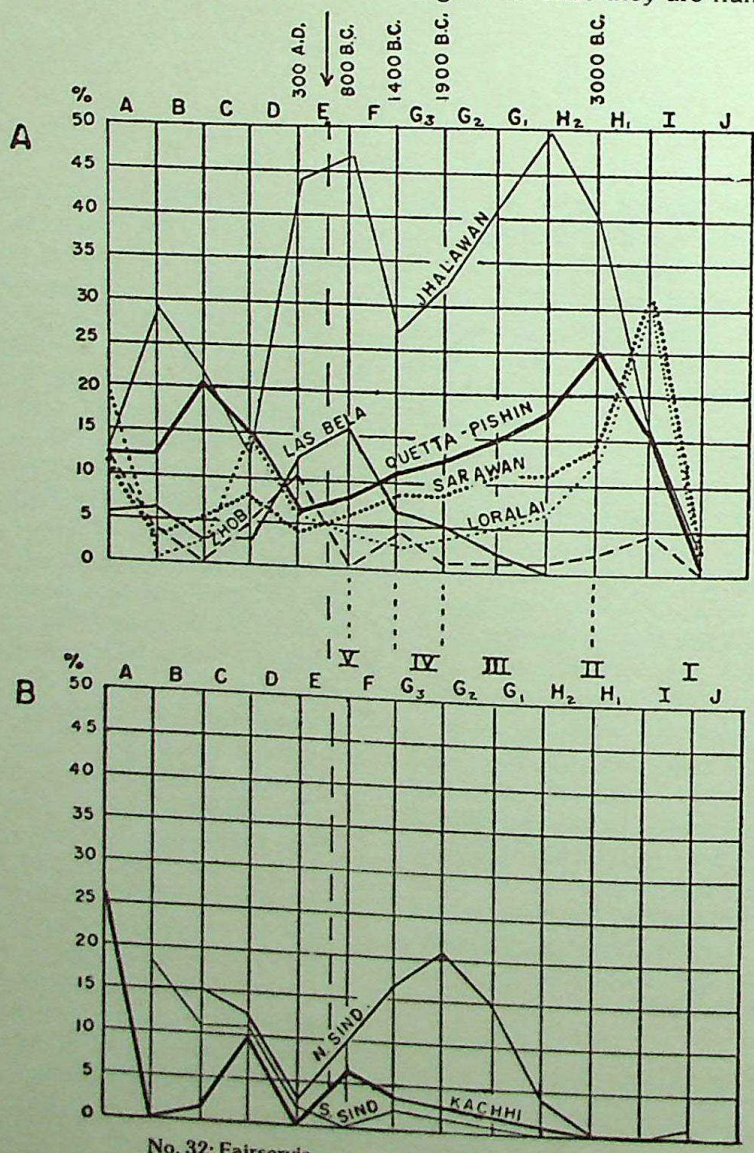
The contrast between the Indus river region and that of the borderlands is not simply a matter of mountains versus great river plains. Indeed,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

much of Las Bela and Kachhi is physiographically identical with the Indus plain. The zoo-geographic contrasts are of more than little significance. The faunal membership of the Indo-Iranian borderlands is Palaeo-European, while that of the southern Indus region is somewhat transitional from that province to the oriental. However, in its essentials, the fauna is a desert one and its affinities are largely western. In other words, there are micro-ecological gradations within a generally similar faunal zone which, in the move towards the plains, reflect proximity to subcontinental biota.

Ethnography

The settlements of Baluchistan consist of camps, transhumant villages, sedentary permanent villages, administrative centres, fishing villages, and pilgrimage places. Camps are temporary, often simple, overnight spots which are largely located along traditional routes of seasonal migration. Thus they are numerous in or on the



No. 32: Fairservis

Chart V: Relative frequency of settlement in each period in the borderlands and southern Indus Valley
A. Baluchistan B. Sind and Kachhi

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

approaches to such passes as the Mula, Bolan, Jhau, and Gomal. Camps vary in their characteristics from simple flat areas on which tents are pitched and cooking fires built to mud-brick enclosures (caravan serai), with the former most numerous. Generally, camps are located near sources of water. Some agriculture is practised in areas where some fertile soil is present **Chart 32.1).**

Transhumant villages are the permanent poles to which pastoral peoples gravitate in their seasonal shifts to the highland from the lowland, and are found largely in Jhalawan and Sarawan.

Permanent villages are those where agriculture is the *primary* source of subsistence. In all cases, however, this is supplemented heavily by cattle as well as some sheep and goats. For this reason, a percentage of the village population may move away from the village to graze flocks or herds in seasons when the hills, often miles from the village, provide grazing. Permanent villages are located close to their fields and the sources of water which provide irrigation moisture for agriculture. Thus villages are frequently found in the centre of valleys where water is in some constant supply in the bed of the mainstream, or are located close to the gravel talus at the sides of a valley where water is accessible owing to springs or shallow wells.

Administrative centres are characterized by forts and the clustering in and about them of the followers of the local ruler or administrator. Most of these centres are located in strategic positions athwart main routes of communication and in defensible positions. Some such as Bela, Quetta, Loralai, Kalat, and Fort Sandeman have, at one time or another, achieved the status of a town or small city—not only in terms of population but, more particularly, as a gathering place of craftsmen, merchants, the military, and the representatives of territories over which the local ruler has control. Fishing villages are confined to the Arabian sea-coast of Makran and Las Bela. It appears that it is only in recent years that fishing, for market purposes, has made that aspect of the economy of Baluchistan important to its inhabitants.

Shrines or places of pilgrimage are usually only of regional meaning with the exception of the famous shrine of Bibi Nana at Hinglaj. Most of these are caves, springs, tombs, or unusual rocks or formations given sacred or mystical qualities according to story and legend. There are usually small settlements nearby where live custodians or locals who use the attraction of the place for commercial reasons, legitimate or not.

The briefest review of the ethnography of Baluchistan underlines the fact that the dictates of pastoralism and the stresses brought on by annual variability of rainfall have been instrumental in requiring the specific responses which are everywhere evident: these are (i) ease of seasonal movement along established routes between the highlands (above 305 m) and the lowlands (below 305 m—including Sind), (ii) the use of methods of intensive cultivation where permanent settlement is achieved. These will be referred to later on in this writing.

ARCHAEOLOGY

Archaeological research in Baluchistan is summarized in **Chart 32.II.** It is of value to examine each aspect of the research according to its character.

Surveys

In the pre-Independence period, the work of Sir Aurel Stein and N.G. Majumdar was the most important. Stein's various journeys to parts of Baluchistan evidenced the widespread character of the late prehistoric settlement. Majumdar, in some contrast, worked mainly in western Sind and more particularly in or close to the Kohistan. His discovery of numerous sites around lake Manchhar and his perceptive journey to Karachi via the Bandhni Nai, produced evidence for both Harappan and pre-Harappan settlement in those regions. It is of some importance to emphasize the fact that the famous site of Amri found by Majumdar is situated on a tongue of Kohistan which protrudes into the Indus plain and is, as are so many sites of western Sind, more truly, a part of the highland borderland ecology than of the Indus plain.

After Independence, the work of De Cardi in Kalat and this writer in Quetta-Pishin, Loralai-Zhob and Las Bela produced a considerable number of sites not known to previous explorers. In particular, the work in the Quetta valley which involved comprehensive foot surveys from one end of the valley to the other, during which sites of *all* periods were noted had the additional value of relative completeness; something especially needed in view of the availability of surface

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

evidence in Baluchistan. Robert Raikes, a hydrologist, carried out especially important surveys as an adjunct to his professional vocation in Sarawan-Jhalawan and Las Bela and, by so doing, filled in gaps in the survey record, especially in southern Jhalawan. George Dales emphasized the coast and discovered the site of Sotka Koh intermediate geographically between Pir Shah Jurio at the mouth of the Hab river and Sutkagendor on the Dasht. More recently, Rafique Mughal of the Pakistan Department of Archaeology, carried out surveys in northern Baluchistan and added to the number of sites known from that region, especially in Pishin and the Hindu Bagh area of Zhob. In all, over 400 sites of different periods are now known for Baluchistan, primarily as the result of these surveys **(Chart 32.III)**.

Most of these surveys were characterized by the usual technique of either spotting mounds as one rode along main or subsidiary routes, or by inquiry of local people, being led to the sites. Furthermore, the visits to many sites were often limited to a few hours during which collections of decorated potsherds and fragments of other clay objects were collected by random search over the *whole* surface of the site. Rarely were plain wares collected nor were many efforts made to partition the site so that collections could be made selectively from the same site. At one time archaeological survey in Baluchistan might be called 'pretty piece' archaeology, or what Sir Mortimer Wheeler once called 'philately'. This has had its influence on conclusions made about the various periods represented in the borderlands. (A further comment on this will be made further on in this writing.)

Excavations

Hargreaves (1929) carried out the best pre-Independence excavation in Baluchistan at the site of Sohr-damb, Nal. This was of value for he was able to demonstrate something of the settlement plan of the principal occupancy of the site. However, the stratigraphy was confused and it is unclear what the succession of habitation levels of the Nal type, the cemetery, and the so-called Kulli occupation actually was. Aurel Stein's technique (1929) was that of trenching. In consequence, he paid little attention either to the find spots of his artifactual discoveries or to their stratigraphic relationships. Majumdar (1934) on the other hand, did maintain better stratigraphic control with his test pits and was accordingly able to clearly establish a so-called 'Amrian' level under the Harappan at various sites of western Sind. Thus, at the time of Independence, excavated evidence in the Baluchistan borderlands was minimal.

One important phenomenon in terms of establishing relative chronologies in Baluchistan, both past and present, has been the attention several field workers have given to the exposed sections of sites. Exposed by the natural collapse of too vertical portions of the slopes, local farmers also cut into sites seeking earth for their fields and, of course, it has been common practice to study the walls of the trenches created by Sir Aurel Stein and others. Brigadier Ross (1946) and his wife were most noteworthy in following this strategy at the site of Rana Ghundai, but Beatrice de Cardi (1959) at a number of sites and this writer at Periano Ghundai, Dabar Kot, and Niai Buthi also obtained some success in utilizing a similar strategy.

De Cardi (1964,1965) is noteworthy for her sensitive and carefully worked-out excavations in Kalat. Limited by time, money, and other factors, she has managed to work out substantive stratigraphics for central Baluchistan.

Jean-Marie Casal (1964) had three seasons each at Amri and at Nindowari in southern Jhalawan. At Amri, he enlarged Majumdar's findings as to the character of the pre-Harappan occupation and was able to demonstrate that the so-called post-Harappan Jhukar occupation might, more correctly, be regarded as a late manifestation of the Harappan. An important finding was the evidence for the donkey in the pre-Harappan levels. At Nindowari, Casal exposed some of the monumental and humbler architecture of the Kulli levels there and has added much needed evidence to our small fund of knowledge of those levels in Baluchistan. George Dales (1962) in turn and more modestly, has with his limited excavations at Sutkagendor, obtained evidence as to the character of a Harappan settlement far in the west. He continued to pursue his interest in coastal sites by his excavations at Balakot in south-eastern Las Bela.

There is some justification in discussing this writer's excavations in Baluchistan after the above brief description of others' work there, simply because the approach taken and the tech-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

niques used are the basis for much of this writer's views as to the position and character of late prehistoric habitation in Baluchistan. As has been so often pointed out, the approach taken is that developed in New World archaeology as part of a basic anthropological assumption. That is, that the evidence from the past is the evidence for the *whole* of culture history, not simply one part or another: political, religious, or economic history. As such, cultures in time *evolve;* they do not change as the abrupt result of dynastic fortune as, for example, happened with the fall of the Mauryas or the coming of the Mughals. It is certain that, for most people, especially those of the rural world, life goes on relatively unchanged in spite of the rise and fall of kingdoms. This fact has a direct bearing upon archaeological strategies for it requires the excavator to devise a technique which measures both change and continuity. In recent years, quantitative techniques have become one of the solid supports for the 'new archaeology'. In 1950-1951, seriation, one of the methods of the quantitative technique, was a relatively new matter and its application in Baluchistan even now has been questioned again and again.

The Quetta excavations had, as their initial goal, the establishment of a relative chronology marked by the ceramic record against which the surface collections gathered by the foot survey of the Quetta valley might be measured. These surface collections were randomly gathered from specific areas of the top and sides of each site. After the completion of the survey, four sites were chosen for excavation: the Karez site (Q-13), because its surface remains evidenced one body of ceramics, including those Piggott had previously identified as 'Quetta Ware': Kechi Beg (Q-14), for its surface remains evidenced a body of ceramics of seeming non-Quetta ware character; Damb Sadaat (Q-8, Piggott's Mian Ghundai), for its surface remains evidenced both the ceramic groups known at Karez and Kechi Beg as well as other sites; Kile Ghul Mohammad (Q-24), because its surface ceramic representation was unique. Another site (Q-10) was also excavated because it held promise of fixing, in a relative chronological scheme, a body of artefacts of historical time.

The excavations were carried out in two simultaneous ways: (i) the recovery of the 'natural' stratigraphy (architecture, soil changes, breaks in occupation); and (ii) the obtainance of the ceramic record, not only according to the 'natural' stratigraphy but within each level of that stratigraphy proper. This approach was worked out as a possible answer to questions as to what extent of time might be represented by the thickness of a specific layer. It was also necessary to place the ceramics in an absolute 20 cm scale where a quantitative technique was to be applied, as in the several sondages attempted.

An order of a quarter of a million potsherds were processed in the course of the season from all sites with about 1,10,000 coming from the stratigraphic excavations, including the special sondages. The two approaches to the stratigraphy outlined above were then combined (Fairservis 1956: 330 ff.) and the standard references, Damb Sadaat I-III and Kile Ghul Mohammed I-IV, worked out. Critical in determining this reference was the relationship of the evolution of the ceramic type to the occupational levels.

The ceramic type is essentially a device for measuring ceramic change. Whether or not it is coincident with the idea of the prehistoric potter is less important than that the type should be consistent in its definition and its consequent use by the archaeologist. The type is created by combining all the features which characterize it. Among these are: construction; firing technique; paste colour; kind; texture; hardness; surface finish; colour; thickness; presence or absence of decoration; and form. When this was done in the Quetta work and the type tested again and again in the laboratory of the American Museum of Natural History, the percentage of each type at each level within the stratigraphy was graphed and the whole laid out according to position within an absolute stratigraphy. Some 32 types were eventually determined and their histories relative to one another quantitatively charted. The result was a lucid picture of the changes in frequency of the types from level to level. In relating this picture to the habitational sequence, it was clear that it was the *climax* of type frequency rather than the occurrence of the end or beginning of the type that defined the broad stratigraphic picture: the ceramic types tended to cluster in their climaxes in multiple conformation of their place in a relative stratigraphy. Marked is the fact that the ceramic frequency graphs demonstrated continuity of occupation across the architectural levels. Of the 32 types defined, 21 were found in

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the lowest levels of Damb Sadaat (I) and the upper levels of Kile Ghul Mohammed (IV) proving a basic correlation and possible contemporaneity or, at least, no great time difference. Particularly fortunate was the discovery of an aceramic horizon in the lowest levels of Kile Ghul Mohammad which gave us one end of our ceramic relative chronology. Radiocarbon dating was then applied to this stratigraphy. The result was that we now had a standard against which to measure our surface collections. This was done by designating a broad relative chronology based on the ceramic frequency tables and differentiated on a period basis. (J-G 3). In order to encompass all periods, including the historical, the chronology was extended to recent times (A) **(Chart 32.III)**. This period designation was intended to form a framework for the whole of Baluchistan in so far as our types could be traced elsewhere. Accordingly, a survey (Fairservis 1959) with some excavation, was carried out in Zhob-Loralai; surveys reached down the Bolan pass, into Pishin, and over to Nushki. Later the work was carried into the Tarnak-Arghandab plain near Kandahar and then to Seistan.

In moving out of the Quetta valley, the intention was as much to test the validity of our types as it was to discover new sites or review known ones. Such ware types as Faiz Mohammad Gray, the wet wares, Khojak parallel striated, Kile Ghul Mohammad black-on-red slip were found to be widely distributed in Baluchistan and, not surprisingly, in the Indus valley. However, new types naturally occurred the farther one went from Quetta and necessitated the development of new stratigraphic studies, something which we were unable to accomplish in an initial season. In fact, the inability to continue the work prevented the refinement which must always be made through continual testing.

It is necessary to describe this work at some length because its intention was to set forth a reliable relative *chronology for ceramics not to describe culture history*. The use of such a chronological standard for the measurement of culture history is a perilous matter and some remark will be made on it further on in this writing. As it now stands, however, the Quetta chronology can be readily correlated with Casal's sequence at Mundigak, with the sequence at Sur Jungal, and with de Cardi's stratigraphy at Anjira. We thus have the beginning of a substantive relative chronological standard for the northern and central parts of the borderlands **(Chart 32.IV)**.

Syntheses

Piggott's pioneering effort both to designate and to correlate the various artefact assemblages of the borderlands is the most outstanding among numerous efforts made over the past thirty or more years. His terms, Kulli, Amri-Nal, Quetta ware, etc. remain valid labels for groups of artefacts whose cultural meaning we now explore. Piggott (1946; 1950) also recognized that there were affinities, especially in pottery decoration, to cultural assemblages in Iran, particularly as defined by Donald McCown (1942) who also recognized them. Since Piggott's work, there have been numerous efforts either to revise or replace Piggott's scheme but, except for certain details, such as the chronological placement of the Quetta assemblage and the sharper definitions of Amri and Kulli assemblages, the scheme remains valid.

The stylistic ties to northern Iran recognized by Piggott and McCown have now been extended to Turkmenistan by V.M. Masson and V.I. Sarianidi (1972) and there is great promise of similar ties to sites of south-eastern Iran, particularly Tepe Yahya (Lamberg Karlovsky and Tosi 1973).

In the context of synthesis it is proper to review the present position.

(1) The Kulli is clearly the latest and most elaborate occupation of southern Baluchistan (Las Bela, southern Jhalawan). It consists of two phases: the earlier suggesting the presence of an indigenous village element found farther to the north not unlike that known in Damb Sadaat II; the later demonstrated by large and elaborate settlements such as that found at Nindowari and Edith Shahr and sharing artefacts with the Mature Harappan of the Indus Valley.

(2) Nal assemblages when found with the later phases of the Kulli, inevitably underlie them; however, there is some overlap with the earlier Kulli phases. There is, however, a non-Kulli Nal assemblage which is clearly earlier than the earliest Kulli phase.

(3) From Zhob to Jhalawan, including the Kandahar region but so far not clearly identified for Las Bela, Makran, Chagai, the Derajat or western Sind, is an assemblage marked by a black-on-red ware variously referred to as Togau (early forms) and Kile Ghul Mohammad black-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

on-red. It seems to mark a time of initial permanent village settlement.

(4) In apparent continuous succession to (3). occur the assemblages to which such pottery types as de Cardi's Zari ware and the Kechi Beg decorated wares, including the various painted dark-rim vessels, belong. This assemblage is very widespread in the borderlands and is manifest in various local styles from the Gomal Pass to Las Bela, the Kandahar plain, the Hab river valley and in Sind at such sites as Amri and Kot Diji. In southern Baluchistan this assemblage also overlaps with the 'non-Kulli' Nal phase mentioned in (2).

(5) With increasing frequency reports of lithic aceramic sites or with crude, often basket-marked pottery come from Baluchistan. This kind of assemblage (flake-blades, ground stone) was found in the lowest levels of Kile Ghul Mohammad in 1950-1951. In spite of the fact that KGM I may represent a pre-ceramic horizon in Baluchistan, this writer is inclined to combine KGM I and II at this date since the lithic material is identical in sites where the handmade wares and lithics are found together (e.g. P-6 in Pishin). The lithics are essentially the flake-blade type and, in general, appear to be smaller in size than the flake-blade industries of later periods, though the term *microlithic* is a misnomer for this industry. Surface remains of this type of assemblage are now reported from Sarawan, southern Jhalawan, the Kohistan, and the western edge of the Indus delta (e.g. Tharro hill). In the stratigraphy, it is now noted in the lowest levels at Anjira, Mundigak, and Rana Ghundai. It has recently been identified at Gumla by A.H. Dani (1970-71) as occurring in the lowest level at that site (I). Radiocarbon dating would now place KGM I as pre-3800 B.C. (Dales 1973) but it does not seem likely that an early date will hold for assemblages such as those of the Kohistan. However, it is of more than a little interest that a true microlithic industry, including geometrics, is showing up in association with an Harappan assemblage in the lowest levels at Allahdino, near Karachi. This underlines the tendency, already apparent, that microlithic industries not only have had a long life in the subcontinent but that in the borderlands and the Indus valley they tend to be found in the more southerly regions, whereas the blade-flake industries tend to be more northern.

Interpretation

In a previous paper (Fairservis 1967) I attempted to interpret the existing evidence for the development of late prehistoric life in the borderlands. Rather than repeat the details of that effort here, it is perhaps more meaningful to underline certain salient features in a different way:

Stage I

The earliest evidence for late prehistoric life demonstrates that a semi-nomadic people who had domesticated sheep and/or goats, possibly cattle, and certainly grew some crops, were moving about in northern and central Baluchistan at least as early as 3500 B.C. The microlithic industries of the south and their proximity to streams and the coast suggests that a hunting-gathering people were also a part of the overall scene. Their contemporaneity is not yet known.

Stage II

In the Quetta valley, Surab, and Loralai, there is evidence of a gradual evolution from the semi-nomadism noted earlier to permanent village life. There is a general similarity in the cultural assemblages known to mark this period and such technological capabilities as wheelmade pottery, copper smelting, stone-bead cutting, rushing and weaving, are well attested.

Stage III

The spread of permanent village life into southern Baluchistan, Kachhi, the Derajat, and into the Indus valley, as well as an increase in the number and rise of settlements in many regions of northern and central Baluchistan. The appearance of systems of mutually intelligible symbolization are designated by stamp seals and potters' marks as well as figurines of cattle and human females. Burials in houses, elaboration of ceramic painting, bronze implements, and fine alabaster vessels are among the traits known for this time. There is a strong suggestion of local styles. Gabarbands are attested for at least the later phases of this period, especially in southern Baluchistan.

Stage IV

The most elaborate period of late prehistoric time best symbolized by large buildings constructed in strategic (high) locations in the midst of a settlement or in a commanding position in a valley.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

There is some falling off of the number of settlements but individual settlements are generally larger than those of the previous period. The Kulli of southern Baluchistan demonstrates intimate contact with the Harappan of the Indus valley. Indeed the latter culture is mainfest in the Duki region of Loralai, the Kohistan of Sind, and the coasts of Las Bela and Makran. Most of the traits known for the villages of the previous periods are present in this period but there are changes in ceramic decorative styles. Interesting is the fact that while localization was a significant characteristic of the earlier cultural assemblages of Baluchistan (Stage III) now there is a greater uniformity, especially in the south (and, of course, in the Indus valley proper).

The Evidence

Aside from the archaeological evidence obtained by excavation and survey outlined above, there are several other significant pieces of evidence supporting the above summation:

(1) Most of the sites of Stage II-IV are located in areas of present day population concentration; that is, where the best resources of soil and water exist whether for seasonal or year-round use.

(2) Many sites of Baluchistan are multi-occupational and demonstrate in one way or another continuous occupation from Stage II to IV.

(3) There is no substantive evidence anywhere in Baluchistan for significant cultural break from Stage II to Stage IV. The breaks occur most frequently between stage I and II, and stages IV and V (the period of abandonment of numerous prehistoric sites in various regions of the Borderlands).

(4) There are stylistic features in pottery, figurines, bangles, seals, potters' marks, etc. which are similar throughout much of Baluchistan in all stages, which is one reason why artefact comparisons are readily made from region to region. Though there are localizations, especially in Stage III, there is no evidence for horizontal or spatial break between regions of the borderlands. There is also no evidence, except in Stage IV, for one region having reached a higher level of cultural complexity than another.

(5) Though there are stylistic ties to regions to the west, especially in stages II and III, there is no evidence for extensive trade. With little exception, all the materials used in manufacturing the local artefact repertoire are obtainable locally or within a hundred miles; what evidence for trade there is, is restricted to a few doubtful luxury items.

(6) Stage IV represents the most non-Iranian cultural aspect in that while the previous stages demonstrate close stylistic affinities, especially to northern Iran, Stage IV contains many non—Iranian features in the motifs or painted pottery, the appearance of human female figurines, the character of public buildings, the type of cattle domesticated, stone drains, etc. all suggestive of the development of a unique indigenous cultural style (I refer to this elsewhere as the evidence for a process of Indianization).

BALUCHISTAN AND THE INDUS CIVILIZATION

The relationship of Baluchistan to the Indus Civilization raises two basic questions: What role did Baluchistan play in the genesis of the Indus Civilization? What was the relationship between the Indus Civilization and Baluchistan in the heyday of that civilization?

The best way to approach the first question is to discard, once and for all, the idea that the Harappan Civilization grew out of contact in one form or another with ancient Sumeria. There is absolutely no evidence for such a phenomenon in spite of years of devoted work on the problem.

Furthermore, the very definition of the phenomenon of civilization is at stake in the study of the Harappan genesis. What do we mean by civilization: cultural complexity of a given kind? urbanization? the foundation of later India? This is a subject which has no simple answer. In many ways the Harappan is more nearly at the level of cultural complexity represented in the early proto-literate of Mesopotamia and the Gerzean of Egypt than it is the cultural peer of the Sumerians or Archaic Egyptians. Is it then a civilization? What evidence we do have, points to a distinct stylistic affinity of the Harappan to cultural assemblages found in pre-Harappan context in northern Sind and the southern Punjab (Kot Diji, Jalilpur) and probably Kachhi (Juderijo-daro). Allchin's (1963) discovery of a cattle pastoralism extant in south India as early as 2000 B.C., the possible relationship of Malwa wares (Kayatha) to those of pre-Harappan Kalibangan (Sankalia 1974), and Rafique Mughal's (1970) recognition

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of an 'early Harappan' in the Kot Diji assemblage demonstrate both, a considerable pre-Harappan antiquity and a developmental sequence of enormous importance to our understanding of the Harappan genesis. What seems to clinch the argument is the fact that the pre-Harappan cultural assemblages of northern Sind and the southern Punjab have *a clear affinity to similar cultural assemblages in Baluchistan of Stages II and III.* Furthermore, whatever the reason, both in Baluchistan and in the Indus Vally (especially Kachhi, northern Sind, and the southern Punjab), there is evidence for an identical growth of population and increasing centralization climaxing in Stage IV. Of great interest here, however, is the fact that sites of southern Sind, northern Punjab (including Harappa), Loralai, and the Karachi area, demonstrate an imposition of a Mature Harappan culture on older settlements (or into new territories). This is clear in the lake Manchhar area sites, and at Amri, and in the Karachi region in such sites as Allahdino and Hasan Wali.

Clearly, there were similar developmental factors inherent in the processes which brought about the conversion of pre-Harappan culture of the Indus Valley into a civilization and converted the smaller village communities of Baluchistan into a more nucleated form. The tracing of these factors remains the most important task of future archaeologists working in the borderlands.

The second question as to Baluchistan at the height of the Indus Civilization is somewhat simpler for there seems little question on our present evidence that the Kulli of southern Baluchistan had a close cultural tie with the Mature Harappan even to the point of sharing artefacts. Casal's (1969) discovery of a Harappan seal at Nindowari and the juxtaposition of Harappan-Kulli remains at sites such as Edith Shahr or Sutkagendor are demonstrative of this point. We are, however, unable to establish at this point whether the Kulli is to be eventually regarded as a provincial aspect of the Harappan, an integration of indigenous traits with those of the Indus Civilization, or perhaps a clear-cut Baluchistan culture related to the Harappan only by trade and perhaps common ideology.

For northern Baluchistan it is clear that the Harappan never penetrated above the 1220 m elevation. The cultural forms represented at Sur Jungal, Periano Ghundai, and the Quetta sites of the time (DS III) are more like that represented at Mundigak (IV) than anything farther south and east in the Indus valley. They suggest the presence of a non-Harappan highland population who were perhaps not too unlike the residents of those regions of recent years.

A further piece of evidence of value in describing the relationship of the southern Indus valley with Baluchistan is based on the results of the surveys outlined previously. Using the period divisions set forth in the Quetta report (Fairservis 1956: 334 ff.) and as applied to the known list of sites from Baluchistan and Sind as described in a later publication (Fairservis 1971, Appendix F) it is possible to establish a regional census for archaeological remains now known (data of 1968) **(Chart 32.III)**. This, of course, with all the reservations one must express concerning order of the evidence, incompleteness, preservation, etc. The graphs **(Chart 32.V)** suggest the following:

(1) That prior to 3300 B.C. (based on uncorrected Radiocarbon dates) the plains of Sind and Kachhi were occupied mainly by non-sedentary groups of people. But in Baluchistan, especially in the north, and on the Jhalawan plateau sedentarization was an ongoing process.

(2) Around 3000 B.C. (based on uncorrected ^{14}C dates) fully established sedentary village life flourished in Quetta-Pishin, Jhalawan, Sarawan, Zhob and Loralai but was still relatively unknown in Sind and Las Bela.

(3) After about 2800 B.C. (based on uncorrected ^{14}C dates) the number of villages in Jhalawan, Quetta-Pishin, Sarawan, Loralai, and Zhob began to decline partially on account of the concentration of population in larger units but also possibly due to movement into the plains. This may have its expression in the rise of sedentary village life at this time in Kachhi, lowland Las Bela, Sind — especially in the north. This reaches a climax around 1900 B.C. (based on uncorrected ^{14}C dates) when over 20 per cent of all settlements known for Sind and the borderlands are found in northern Sind. This is, of course, the time of the dominance of the Mature Harappan Culture there.

(4) Between 1900 B.C. and 1400 B.C. (based on uncorrected ^{14}C dates) there is a gradual decline in all the characteristic village settlements of prehistoric type in both Baluchistan and neighbouring Sind. A decline, which for most of the region, continues on the evidence, to about 300

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

A.D.

(5) Important exceptions, however, are found in Jhalawan and Las Bela where around 800 B.C. there is a marked rise in the kinds of settlement marked by such as the Complex B assemblages of Las Bela. Kachhi and Loralai also seem to have a rise in settlement in the period around 800 B.C. One tends to think of the growth of transhumance as possible in this period owing to the parallel rise in the number of Jhalawan settlements and those of Kachhi and Las Bela in the lowland plains — a situation typical today.

(6) The evidence for the later periods represented on the graph is given some support by history in the recorded rise of Arab power in the borderlands and the security imposed by the British in modern times.

(7) The dates used herein are admittedly conservative, especially as regards the prehistoric period (i.e. G_3-J), whereas as the Radiocarbon evidence for an early fourth millennium or even late third millennium date for KGM I appears acceptable, the dates for the Harappan have always to be accorded with two other criteria: the securely associated Akkadian context of Harappan seals, and the scale of the gap caused by the Vedic and Kassite periods. There is no evidence that Baluchistan was extensively abandoned in that later period—as the graph shows, the facts are quite to the contrary. Casal's convincing thesis as to the Late Harappan affiliation of the Jhukar, evidences a longer life for the Harappan in Sind and makes viable an overlap with the next cultural assemblage as is suggested for Complex B with the Kulli in Las Bela. The Radiocarbon dating has already varied twice in its chronology and becomes less and less convincing without other resources.

Ethnohistorical Principles And The Future

It is a truism that what is desperately needed in the archaeology of Baluchistan are less surveys and sondages and more extensive, sensitive, and skilful excavations of key sites on a horizontal basis. It may seem rash at this point to state that though we may double the number of prehistoric sites known in Baluchistan in the next few years, it is very doubtful that the basic ceramic stratigraphy, outlined above, will change very much in the regions, at least where it is now established. Nor in the context of modern archaeology will it really matter very much if it does. The era of the potsherd is hopefully drawing to an end because holistic full-scale horizontal excavation will take its place as it should have twenty odd years ago.

Yet even with the above desiderata accomplished, how are we to use the evidence? It is here that the ethnohistorical approach has its greatest validity, not only indeed to the future but to possible reinterpretations of existing evidence. Simply stated, ethnohistory refers to the fact that traditional life in modern Baluchistan for which we have far more knowledge than any life in the archaeological past, can form a model for our interpretation of that past. The chart **(Chart 32.I)** which is based on information provided in the Baluchistan Gazetteers (1906) and the work of later ethnologists (e.g. Warren and Nina Swidler) sets forth the kinds of settlement and their characteristics typical of Baluchistan as recorded over the past one hundred years. Unless we are to argue for significant climatic change in the last five thousand or so years or for the previous existence of more complex cultural forms, it can be said that these kinds of settlement in one way or another have characterized Baluchistan for many millennia. (There is the probable addition of hunting-gathering groups who are almost universals wherever game is abundant as might have been before the advent of the gun.)

If we examine the archaeological evidence for late prehistoric settlements, it appears that the bulk of the sites are of the sedentary permanent village type. This gains added credence in the face of the fact that there is no evidence for the existence of either the domesticated camel or the horse in the faunal records of Baluchistan though there is evidence for the existence of the donkey. In the latter case, the only record is that at Amri. Accordingly, it is doubtful that transhumance of significant scale was present in late prehistoric Baluchistan. Permanency in Baluchistan demands intensive exploitation of agricultural resources, including some form of water control. The vagaries of *khushkaba* cultivation do not seem sufficient to support the continuity of occupation apparent in many sites of stages II-IV. Thus the gabarband relationship to permanent settlement in prehistoric times gains circumstantial support. Furthermore, a number of sites in Baluchistan are next to modern villages whose sole moisture resource is the *karez*. Was that famous system so ancient? If so, an important technological capability is added to the repertoire of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

prehistoric man in these regions with consequences of many kinds.

The fact that sedentary permanent villages need not be tightly nucleated, raises all kinds of questions relative to our evidence from prehistoric times. Among them, the strategy of excavating only what is apparent.

The size and architectural elaboration of settlements in Stage IV indicate the possibility of large centres whose role had regional significance. What was their purpose: religion, commerce, authority, or a combination of these? We know today that administrative centres are dependent on the villagers of the surrounding landscape for subsistence and marketable commodities. It is of interest that, so far, investigation of these large sites has revealed no substantive evidence for extra-regional trade unless one is to argue for Kulli-Harappan commerce.

Finally, the existence of prosperous fishing villages along the Arabian Sea shore gives us an alternative reason for the presence of Harappan sites along that same shore. The seaport hypothesis seems to be less credible in the face of this more likely alternative.

Probably the most important contribution the ethno-historical approach can make is to demonstrate that consequences are not haphazard. Anthropological understanding of the relations between all aspects of culture narrows the spectrum of alternatives. Thus, if we have evidence for a certain way of life, we also have a means of approximating such archaeological intangibles as social organization, polity, and aspects of ideology. These approximations, in turn, have their own consequences. In the case of Baluchistan the ethno-historical approach may have a wide and most important consequence in our understanding of the genesis of the Indus Civilization.

REFERENCES

Allchin, F R. 1963. *Neolithic Cattle-keepers of South India—A Study of the Deccan Ashmounds.* Cambridge.

Casal, J.M. 1961. *Fouilles De Mundigak.* Memoires de la Delegation Archaeologique Francaise en Afghanistan. Vol. 17. Paris.

———. 1964. *Fouilles d'Amri.* Publication de la Commission des Fouilles Archaeologique Fouilles dur Pakistan. Paris.

———. 1969. *La Civilisation de L'Indus et Ses enigmes.* Paris.

Dales, G.F. 1962. A Search for Ancient Seaports. *Expedition.* Vol. 4, 2; 2-10.

———. 1965. A Suggested Chronology for Afghanistan, Baluchistan and the Indus Valley. In *Chronologies in Old World Archaeology* R.W..Ehrich ed.

Dani, A.H. 1970-71. Excavations in the Gomal Valley. *Ancient Pakistan.* Vol 5; 1-77.

De Cardi, B. 1959. New Wares and Fresh Problems from Baluchistan. *Antiquity.* Vol. 33; 15-24.

———. 1964. British Expedition to Kalat, 1948 and 1957. *Pakistan Archaeology;* No. 1; 20-29.

———. 1965. Excavations and Reconnaissance in Kalat, West Pakistan. *Pakistan Archaeology;* No. 2; 86-182.

Fairservis, Walter A., Jr. 1956. Excavation in the Quetta Valley, West Pakistan. *APAMNH.* Vo. 45; pt. 2; 165-402.

———. 1959. Archaeological Surveys in the Zhob and Loralai Districts, West Pakistan. *APAMNH.* Vol. 47; pt. 2; 277-448.

Hargreaves, H. 1929. Excavations in Baluchistan 1925, Sampur Mound, Mastung and Sohr Damb, Nal. *MASI.* No. 35.

Khan, F.A. 1965. Excavations at Kot Diji. *Pakistan Archaeology;* No. 2; 11-86.

Lamberg-Karlovsky, C.C. and Tosi, M. 1973. Sahri-i-Sokhta and Tepe Yahya: Tracks on the Earliest History of the Iranian Plateau. *East and West.* Vol. 23; 1-2; 21-53.

Majumdar, N.G. 1934. Explorations in Sind, *MASI.* No. 48.

Masson, V.M. and Sarianidi, V.I. 1972. *Central Asia: Turkmenia before the Achaemenids,* London.

McCown, D.E. 1942. The Comparative Stratigraphy of Early Iran. *Studies in Ancient Oriental Civilization.* No. 23, Chicago.

Mughal, M.R. 1970. *The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan.* Philadelphia (unpublished Ph. D. thesis).

Piggott, S. 1946. Chronology of Prehistoric North-West India. *Ancient India.* No. 1; 8-26.

——— 1950. *Prehistoric India.* London: Pelican.

Rose, E.J. 1946. A Chalcolithic Site in Northern Baluchistan. *JNES;* 1 Vol. 5; no. 4; 291-315.

Stein, Aurel. 1929. An Archaeological Tour in Wazirstan and Northern Baluchistan. *MASI.* No. 37.

———. 1931. An Archaeological Tour in Gedrosia, *MASI.* No. 43.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

33

Jean Francois Jarriage

Towns and Villages of Hill and Plain

Among the major contributions Sir Mortimer Wheeler brought to South Asian studies, his famous book *The Indus Civilization*, first published in 1953, as a supplementary volume to the *Cambridge History of India*, will be remembered as a masterly synthesis of the Indus Civilization. In the 3rd edition (1968) of the book, he incorporated fresh evidence provided by the then ongoing research in India and Pakistan. Wheeler gave a picture of the Indus Civilization which was so clear and comprehensive that his book, in its different editions, has become an authority on the subject. But one should not forget that some scholars, with due respect to Wheeler's undisputed contribution to South Asian archaeology, challenged some of his views which, as a whole, remained close to the ideas expressed by Stuart Piggott in *Prehistoric India* (1950) The problem of the origin of the Indus Civilization, in particular, was a matter of controversy between Wheeler and W.A. Fairservis. Fairservis in two major articles: "The Harappan Civilization: New Evidence and More Theory" in 1961, and "The Origin, Character and Decline of an Early Civilization" in 1967, challenged some of Wheeler's concepts regarding the early chalcolithic cultures which preceded the emergence of the Indus Civilization. In this short article we would like to discuss the controversial interpretation of the "towns and villages of hill and plain", in Wheeler's expression, using the new evidence brought by recent research.

Before presenting a comprehensive account of the Indus Civilization, Wheeler had indeed to discuss the problem of its origin. At that time, concepts of diffusionism from the west to the east, prevailed in the field of Asian archaeology. Let us remember that, until the recent discoveries of early sites in China and Thailand, even the beginning of agriculture in south-east Asia was thought to be the result of direct Near Eastern influences. But Wheeler was struck by the originality of the Indus Civilization which could not be directly linked to a Mesopotamian influence. The other alternative could have been to consider the Indus Civilization as derived from the earlier farming villages of Baluchistan and Sind. But Sir Mortimer Wheeler was a man well known for his efficiency and dislike of disorder when on an excavation. For him the 'ill-sorted industries and cultures' of the hills and the plains with their numberless styles of ceramics were evocative of disorder when compared with the well-planned cities of the Indus and the homogeneous and standardized Harappan culture extending over an enormous surface. It was then difficult for him to conceive that such an impressive civilization, characterized by well ordered and stereotyped features, could derive from a disorder of countless cultures defined by the variety and the fantasy of their pottery styles. Therefore, the study of earlier sites in the hills and the plains was of scholarly interest but was not likely to provide evidence to understand the character of the Indus Civilization. According to him, these cultures were, in respect to the Indus Civilization of 'no concern save as a back curtain to the main scene' (Wheeler 1968:9). His opinion, as it is well-known, was that an exceptional group of people, stimulated by the 'idea' of civilization which

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

spread from Mesopotamia to the Indus Valley, were suddenly able to setforth the bases of an urban civilization. The Indus Civilization was the 'sudden offspring of opportunity and genius' (Wheeler 1969:25). The study of the earlier cultures would provide a repertory of some painted motifs on pottery or a few objects which were to be found later on in the Indus Civilization, but emerged here in a totally different cultural world.

For Wheeler, Casal and many other specialists, the earlier cultures of Baluchistan, usually dated to the end of the 4th millennium, were seen as the result of movements off the Iranian plateau. In the Indus Valley, the Amri culture was thought to be a blend of local elements with Iranian influences represented for instance, by the potsherds in Togau B and C style. Fairservis (1967: 6) says of these early settlements that 'the tradition bears a relationship to the Sialk-Djeitun level of development of Iran and Turkmenistan, respectively, but is so much later, at least according to present evidence, that it appears to be a localized and long-enduring survival of that tradition'. To explain the delay with which Baluchistan and the Indus Valley were affected by cultural trends from Iran or Turkmenistan, Fairservis postulated the existence of a variety of 'forest' hunting cultures in the Indus Valley and elsewhere. The fact that the subcontinent was not a cultural vacuum is, still, according to Fairservis, the basic reason why new cultural elements were retarded in their movement from the Iranian plateau. Fairservis thinks of the several sites which yielded tools of a mesolithic type in northern and western India. Such forest people could have contributed in their contact with agriculturists belonging to an Iranian tradition to the beginning of a process of 'Indianization'.

Fairservis has strongly reacted to Wheeler's view of the Indus Civilization as the result of an 'explosive evolution'. The period of Urbanization, which is the Stage IV in Fairservis's (1967:9) reconstruction of the prehistoric sequence of Baluchistan and Indus valley, is the direct result of a process which accelerates itself in Stage III, the 'Fully Developed Sedentary Village Stage'. This stage, for Fairservis, is of great importance since it provides evidence not only of movement off the Iranian plateau but also of movements from the hills to the plains resulting in a successful adaptation of farming economy to a new environment. The study of these early sites in the plains leads Fairservis to challenge Wheeler's opinion that the Indus Civilization has no significant link with them. For Fairservis (1967:17):

> Most significant is the style found in northern Sind, along the southern borders of the plain of Kachhi, and the foothills of the Kirthar Range . . . The above style characterizes some of the styles of the Harappan civilization and, in fact, is known to have existed prior to the mature phase of that civilization at certain sites, including Mohenjo-daro. This provides a reason to label it Early Harappan and thus in the direct line to the so-called mature urbanized phase of that culture.

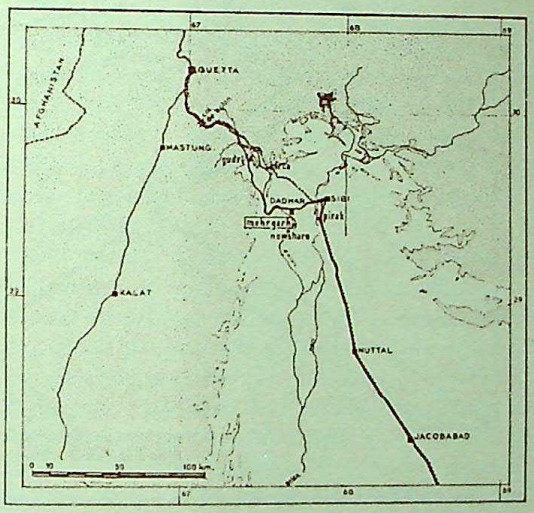
But, Wheeler, like Casal, would object to considering the Kot Dijian and Amrian sites as representing an early Harappan stage since these local cultures were apparently suddently superseded by the mature Harappan culture. Casal thought that Harappan modes were intrusive at Amri. Here, according to Casal (1964:64) we have a first stage when the Amri culture living rather in isolation begins to be very slightly influenced by the Harappan culture as early as Period ID. This influence would increase during Period II until suddently the Amri culture disappears, incorporated in the mature Harappan culture. At Kot Diji the situation would be similar; in the later stage of the Kot Dijian phase we have more and more Harappan motifs or objects showing an increasing Harappan influence until, after a burnt layer, there is a general take over of the site by the mature Harappan culture (Khan 1965:22). This would suppose that a separate group in the Indus Valley, responsible for creation of the Indus Civilization, lived during its first stage rather isolated from the local Amrian and Kot Dijian cultures; a few 'Harappan' objects at Amri or at Kot Diji would be the proof that these people already did exist. Suddenly, in a second stage these Harappan people would reach a stage of maturity accompanied by an expansionist policy which conducted them to take control of all the sites in the Indus Valley with whom they had at first very little intercourse. Here we face the danger which results in cataloguing objects or decorative motifs as diagnostic of the Harappan culture. For instance at Mehrgarh, in Baluchistan, as early as 3000 B.C., we notice the occurrence of painted motifs of fish-scales, intersecting circles, pipal leaves along with a few bowls whose bottoms are decorated with concentric rows of thumb incisions. Such elements are, of course, not proof of the existence of a Harappan group

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

who would have already settled in the Indus Valley and started to have limited intercourse with the inhabitants of Mehrgarh.

There is little doubt that many of the conceptions about the Indus Civilization which were prevalent in the sixties and even later must now be reconsidered. The forthcoming publication by Dales (1982) of his work at Mohenjo-daro and of unpublished work by Wheeler at that site will provide basis for a fresh rethinking about the Indus Civilization. Let us remember that Casal found at Amri a clear evolution of the Harappan pottery in the course of Period III and put forward a style of pottery in Phase IIIC which is also present at Mohenjo-daro though absent at Harappa. It is indeed obvious that a closer examination of the sites of the Indus Valley will reveal spatio-temporal variations which will have to be accounted for to understand the nature of the Harappan phenomenon. But what we would like to point out here is that this better understanding of the Harappan phenomenon supposes a complete reappraisal of the earlier cultural phases of Baluchistan and the Indus Plain.

New evidence, in particular from the still ongoing excavation at Mehrgarh, suggests that the original character of the Indus Civilization will not be properly understood as long as the peasant cultures of Baluchistan and the Indus valley are thought to belong to a marginal area affected, only after long delays, by the cultural developments of the Near East (Gupta 1978). We do not intend to present here another summary of the main results of the excavations at Mehrgarh by the French Mission in collaboration with Department of Archaeology of Pakistan (Jarrige and Lechevallier 1979: 463-535; Jarrige and Meadow 1980: 122-130). But we would just like to insist on a few points showing that, on the basis of restricted archaeological investigations, the part played by these earlier cultures in the general process to which the Indus Civilization must be linked — as Fairservis rightly suggested — could not fully be appreciated. Mehrgarh is a site
124 which provides us with a continuous sequence
125 from an aceramic Neolithic phase (Period I) to a late phase (Period VII) where, mixed with pottery types and objects characteristic of the Damb Sadaat III style, as defined by Fairservis, we have the occurrence of 'Kot Dijian' pottery, along with a few terracotta cakes and long parallel-sided chert blades. The dates of the Neolithic settlement at Mehrgarh are difficult to assume on the basis of the ^{14}C results already available. These results range from obviously too early dates such as 6743 ± 250 B.C. to apparently too late dates around 4000 B.C. (uncalibrated). In between, dates such as 5378 ± 290 and 5182 ± 80 B.C. (uncalibrated, half-life 5730 years) should be closer to the reality. The Neolithic deposits which represent an accumulation between 7.50 and 9



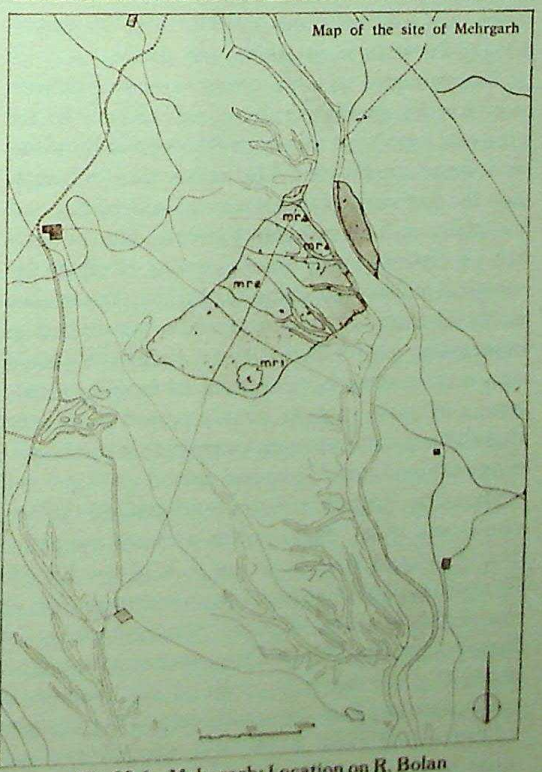


Fig.33.1. Mehrgarh: Location on R. Bolan

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

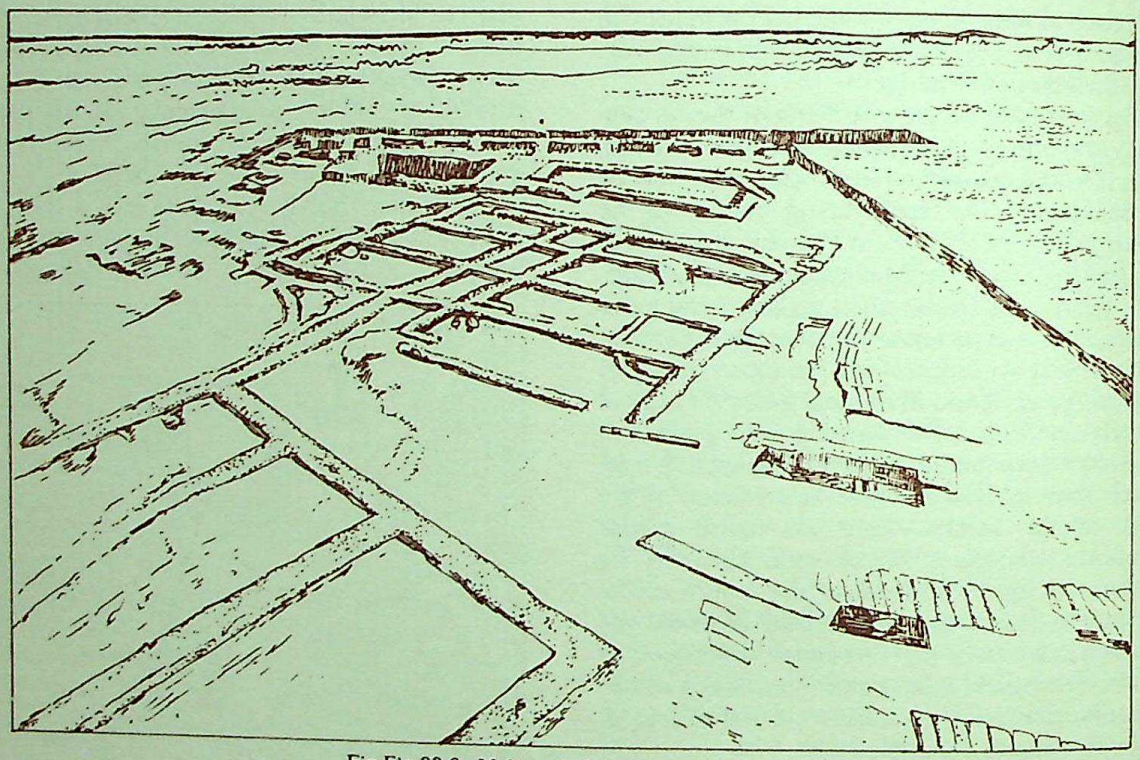


Fig.Fig.33.2. Mehrgarh: Nelolithic structures

metres can probably be dated to the 6th millennium, and a date around 6000 B.C., for the beginning of the settlement, seems very likely.

This provides us with a new temporal dimension for the peasant cultures which had to be crowded before on a span of time of five hundred or one thousand years. This rather short chronology for the early settlements of Baluchistan and the plains has contributed to increasing the feeling of diversity and heterogeneity of styles attributed to isolated cultures. In fact, the spatial study of these cultures was often conducted in association with a distorted time-scale. We have now to visualize the sequence of farming settlements in these regions over a period of at least three and a half thousand years before the beginning of the mature Harappan period.

By its geographic position and altitude (150 m above sea level), Mehrgarh is a site of the plain. The district of Kachhi at the foot of the Kirthar Ranges can be considered the western margin of the Indus valley, though administratively in Baluchistan **(fig. 33.1)**. Excavations at Mehrgarh show that, in the beginnings of the 6th millennium, farmers had started exploiting the margins of the Indus Valley, adapting themselves successfully to the ecological situation of the alluvial plain, more than two thousand years before the beginning of Amri. Fairservis's assumption of an aceramic Neolithic phase in the Quetta Valley, based on his sounding at Kili Ghul Mohammad, is now justified, though its dating on the basis of a probably incorrect ^{14}C result was much too late. The type of farming economy practised by the inhabitants of Mehrgarh **(fig. 33.2)**, the lithic industry, the system of mud brick cell-plan buildings, the burial practices, the figurines and the crafts give us evidence of a vast Neolithic continuum from the Zagros to the margins of the Indus valley.

The significance of such discovery for the later cultural stages in the Indus valley has now to be assessed. Should we consider the first settlers at Mehrgarh as an eastern ramification of the Western Asian Neolithic communities which, isolated from the innovation centres of the Near East, managed to survive in a rather poor and backward way on the boundaries of the great alluvial plain of the Indus, until new movements off the Iranian plateau and Turkmenistan around 3000 B.C. acted as a new cultural stimulus? We would then change very little to the tradition of South Asian archaeology of explaining cultural developments as a result of cultural diffusion from the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

West. In fact our work at Mehrgarh suggests a very different type of interpretation. The identifications made by L. Costantini in the earlier levels of the Neolithic settlement indicate that we are dealing with a region where cereal cultivation was very successfully adapted to local conditions. This should not come as a surprise since scientists like Vavilov and others (Sakamoto, Gul and Kawahara 1980: 34) have thought that Afghanistan and, by extension, Baluchistan should be considered a primary centre of origin of some of the most important crops. It is significant to see that the earlier farmers at Mehrgarh cultivated, besides emmer, einkorn and two-row barley. Such cultivations, early in the 6th millennium, tend to indicate that certain areas of the boundaries of the Indus valley were occupied by agriculturists who were very successful in selecting superior cereals such as free-threshing wheat and six-row barley.

At Mehrgarh, we can also see a clear transition from hunting to herding (Meadow 1981). In the lower levels of the Neolithic phase, the faunal remains are, to a very large extent, characterized by bones of hunted animals. Identifications of gazelles, wild sheep, swamp deer, wild goats, wild cattle, onagers, nilgai and, in one case, of an elephant suggest a 'savanna' type of environment. By the end of the Neolithic phase the faunal assemblage is characterized almost exclusively by the remains of domesticates. Such a shift, over time, from hunting to herding has been evidenced at several sites in western Asia, but at Mehrgarh there is a significant specialization for cattle herding, and after 5000 B.C., domesticated cattle, probably zebus and water buffalos, become predominant. This is also another example of an original adaptation compared to the early Iranian village cultures where goats and sheep remained predominant over cattle. In this connection, it is interesting to remind one that Fairservis thought cattle played a very important part in the battle man had to fight, in India, to control his environment. Fairservis (1967:27) also stressed that, unlike sheep and goats, cattle are dependent on the same soil resources as man who, to increase his cattle, needs to open more fields. Indeed, the Indus Valley offered almost limitless possibilities to open more fields and, so, to increase cattle, in contrast to the situation in the Iranian plateau and Baluchistan, where there are strict geographic limitations. Therefore, it appears now that this cumulative process of more fields, more cattle, and so on, started as early as the sixth millennium in the riverine plain. The spreading of farming in these riverine plains was also dependent on the selection of cereals adapted to local conditions. We, of course, have rather poor evidence of the cultivations during the Harappan period. Nevertheless the wheat cultivated by the 'Harappans' is often referred to as *Triticum compactum* or *sphaerococcum*. For Vishnu-Mittre (1974:8) 'it seems that the ancient wheat in India was *T. sphaerococcum*, a hexaploid, which is even today basically adapted to north-western India'. *T. sphaerococcum* is indeed a compact and short variety of wheat well adapted to flood irrigation and which is present at Mehrgarh as early as 4000 B.C.

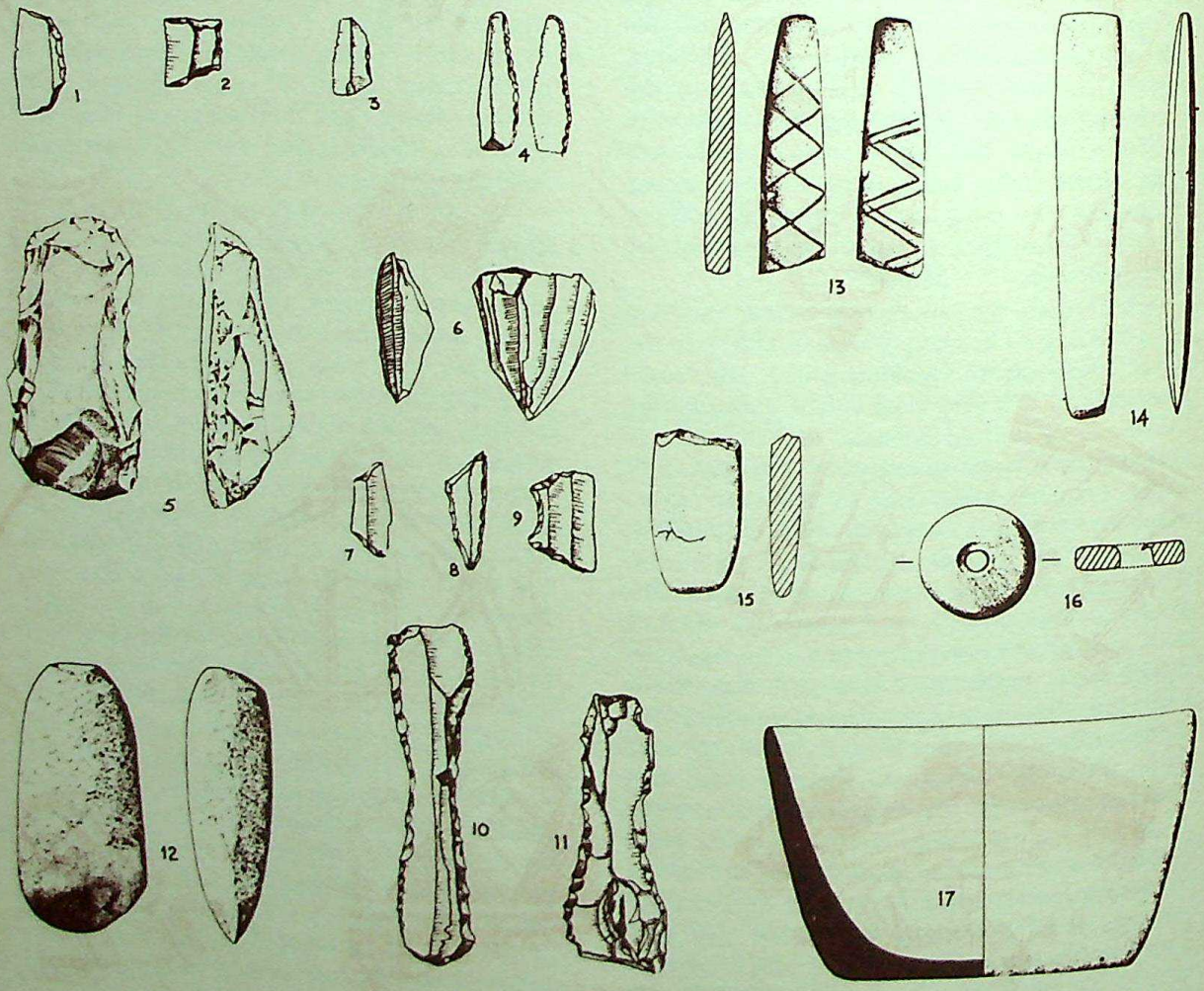
The spread of farming in the plain provoked disturbance in the natural vegetation and of the habitat of several species of wild animals. This stimulated the process of domestication and reduced, progressively, the part played by hunting in the diet. How close to the Indus river did these early farming settlements extend in the course of the sixth and fifth millennia? It is indeed, difficult to know since the Neolithic site at Mehrgarh is, except for its summit, buried 9 or 10 metres deep in alluvium. One can imagine the limited chance we have of locating such site, if they did exist at that time, in the heart of the alluvial plain where the rate of aggradation of the surface was much higher than in the north of the Kachhi plain. But we can well assume that Mehrgarh was not an isolated site in the plain and that, by the fifth millennium, farming was well spread in the alluvial lowland. This evidence raises again the question of contacts between peasant cultures and the 'forest' hunting cultures. As we mentioned above, Fairservis postulated that hunting 'forest people', living in the river valleys of northern and western India with peasant communities belonging basically to an Iranian cultural stock. From such a connection, a process of 'Indianization' of these peasant cultures resulted.

Such contacts have now to be viewed on a much broader temporal scale than could be thought of before the discovery of the Neolithic settlement at Mehrgarh. The first settlers at Mehrgarh, besides cultivating, devoted a large part of their time to hunting according to the faunal assemblage of the early levels. The stone industry, of these early levels, include a small percentage

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of geometric microliths, trapezes, lunates and triangles (about 4 per cent of the tools). Some of these geometrics were used as sickle elements, but others were probably elements of composite arrow-heads; we also found a trapeze which was set in bitumen in a way indicating that it was used as a transverse arrow-head. In Western Asia, geometric microliths in the Neolithic settlements account for a limited percentage as is the case at Mehrgarh, and are considered a survival of earlier Epipaleolithic traditions. In Baluchistan, we have so far no evidence of hunting camp sites with 'Mesolithic' types of flint tools. Monique Lechevallier who is conducting excavations in the aceramic levels at Mehrgarh has pointed out the similarities between the lithic industry of this site (fig. 33.3) and those of the early settlements in Zagros and Central Asia (Lechevallier & Quivron n.d.). It is therefore very likely that the geometric microliths of Mehrgarh also belong to the same tradition.

This raises the question of geometric microlithic industries of north-western India which are not easy to link with the Upper Palaeolithic industries of Indus (Allchin and Allchin 1968:78). In our present stage of knowledge, the 'Mesolithic' cultures represented at excavated sites like Adamgarh, Bagor and Langhnaj are of a rather late occurrence. The earliest date provided by shells from Adamgarh is around 5500 B.C., other dates from this site and from others are later. Evidence from Adamgarh, Bagor or Langhnaj indicates that a mixed hunting-pastoral economy was practised. The occurrence in the cultural sequence of these sites of pottery and metal objects raises the question of the relationship between



Painted pottery from MR. 3. Period I

Fig.33.3. Mehrgarh: Lithic objects, Period I

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

these 'hunter-pastoralists' and the sedentary farmers (Allchin, Goudie & Hegde 1978:330). The discovery of a Neolithic settlement, already established in the seventh millennium, on the border of the Indus valley, indicates that the contacts, postulated by Fairservis and B. Allchin, between agriculturalists and hunter-gatherers of a Late Indian Stone Age tradition could have started in an earlier context than was thought of before. It should be of great interest to investigate the possible influence of the hunting techniques of the earliest settlers at Mehrgarh using composite and transverse arrow-heads in the general context of the Late Stone Age communities. Contacts and cultural interaction between different types of communities as early as the seventh millennium in the north-western part of the subcontinent are important factors which deserve being investigated in order to understand the orginality of the cultural phenomena in these regions.

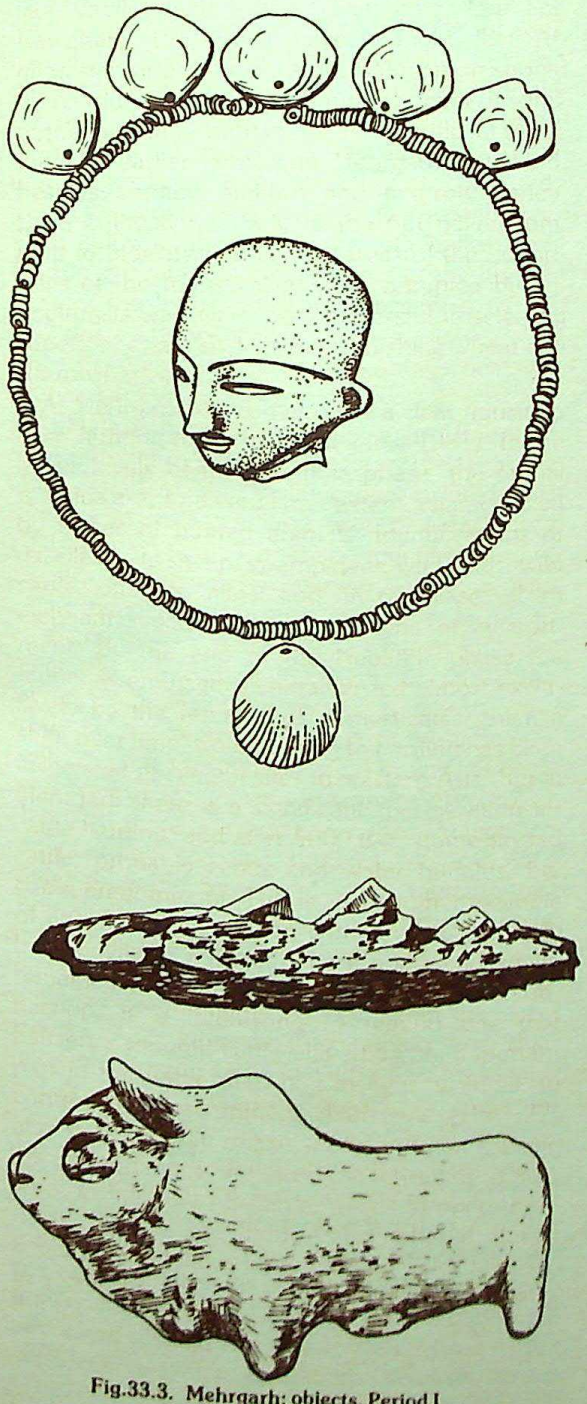
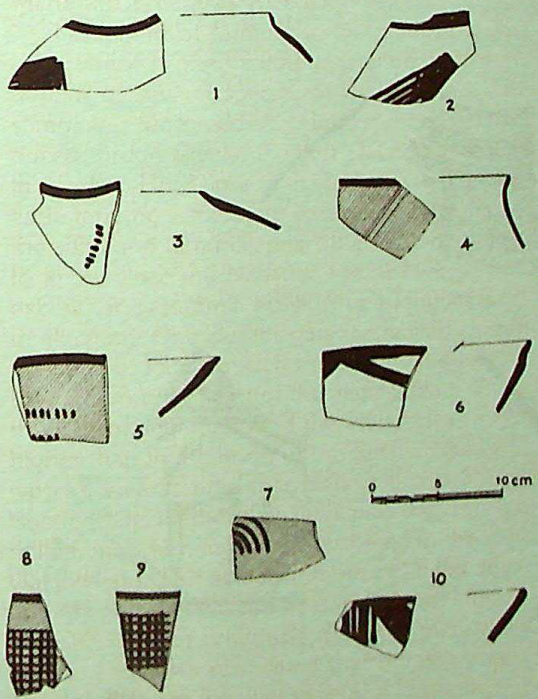


Fig.33.3. Mehrgarh: objects, Period I

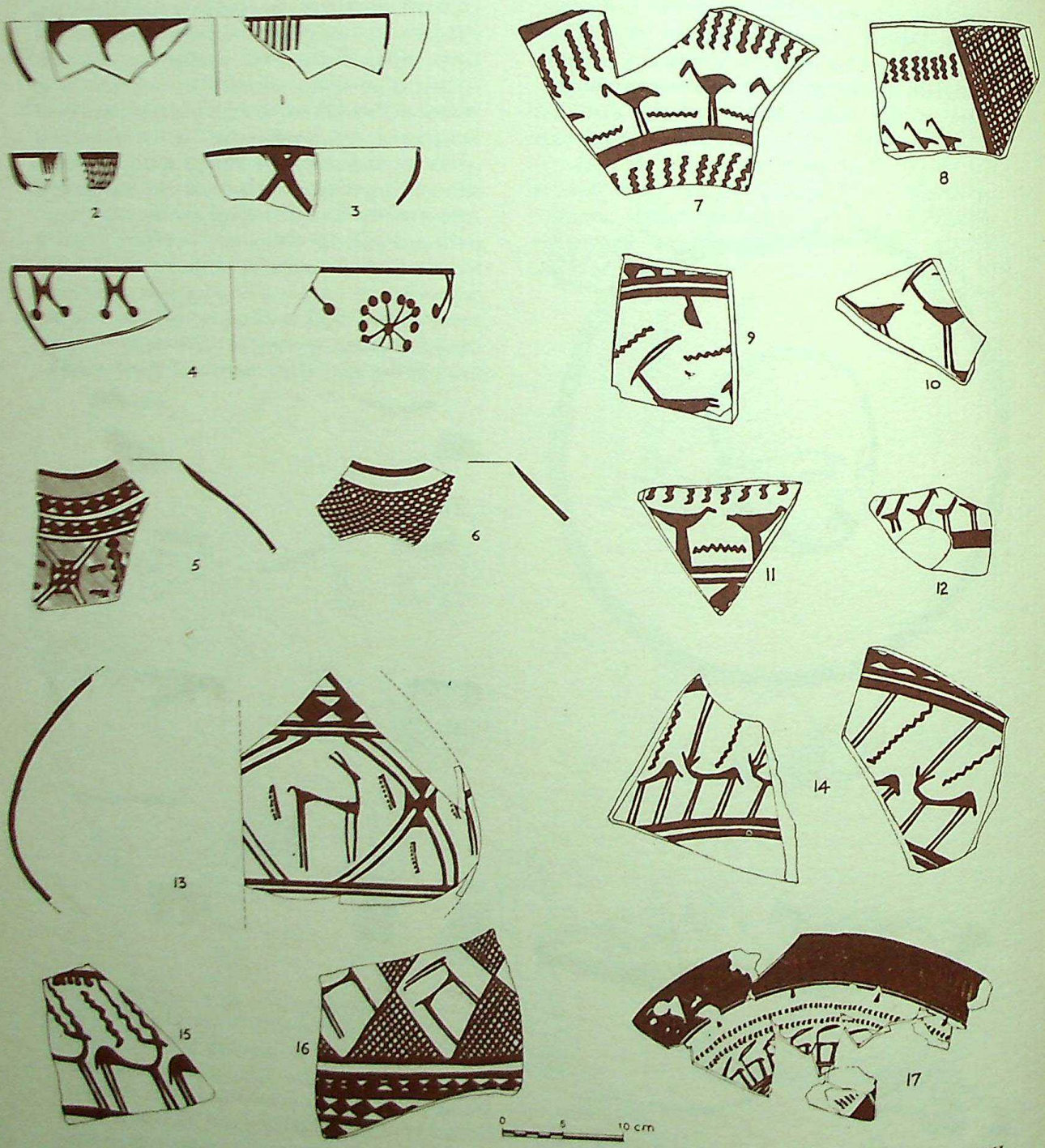


Painted pottery from MR. 4. Period II b

Fig.33.4. Mehrgarh: Pottery of Period II

The early sites in Baluchistan and in the Indus valley have often been defined as farming settlements with a rather undiversified social structure, limited craft specializations and without connection to a long distance exchange network. A typical example could be Amri, a farming village with its bichrome hand-made pottery regarded as its only craft achievement. This point might be an underestimation of the social complexity of these early villages. The ornaments associated with the Neolithic graves at Mehrgarh reveal a highly skil-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



Pottery with painted caprids. MR. 2, Period III

Fig.33.5. Mehrgarh: Pottery of Period III

ful workmanship. Twisted strands of strings of micro-beads in black steatite **(fig. 33.3)** are often associated with the Neolithic skeletons. Some of the beads are very small with an external diameter less than 3 mm. Some are so minute that they suggest that the craftsmen had a well advanced level of technology in the sixth millennium. This is of course, interesting since the micro-beads in steatite recovered at Harappa, Chanhu-daro, Kalibangan and Lothal have attra-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

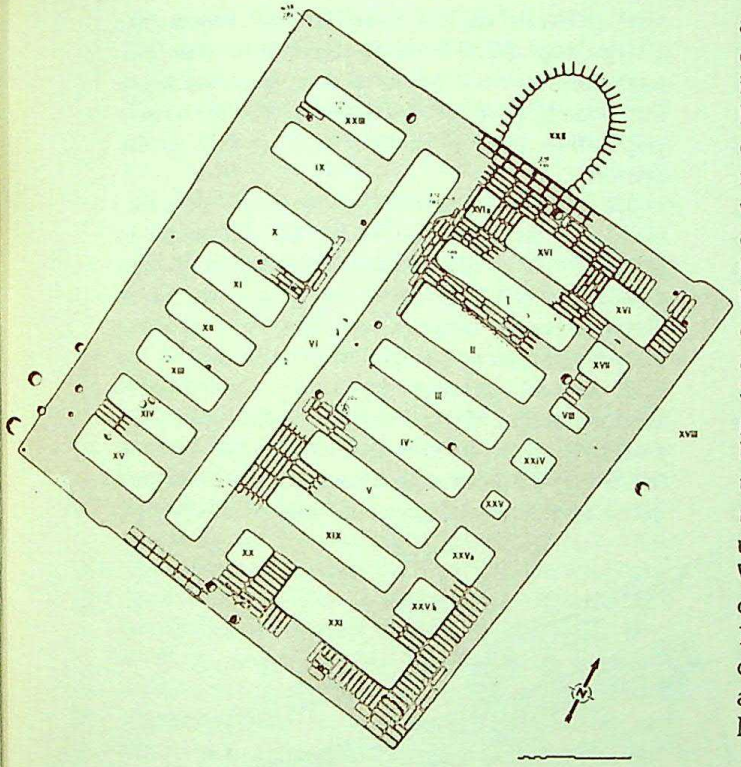


Fig.33.6. Mehrgarh: Compartmented building, MR. 2 south, Period III (4000-3500 B.C.)

cted the attention of archaeologists who regard them as a good example of the high level of Harappan workmanship (Hegde and others n.d.). It appears now that the Harappan micro-beads can be linked to a long and well established tradition. Neolithic craftsmen at Mehrgarh also worked on imported semi-precious stones such as turquoise and lapis lazuli. They also showed great skill in making ornaments with sea-shells imported from the coastal area, more than 700 km away. In the levels of Period I and II at Mehrgarh, workshop areas where calcite and steatite beads were made, have been found associated with the tool-kit of the craftsmen. In Period II at Mehrgarh (5th millennium), we see, after a period marked by the presence of a coarse chaff-tempered handmade pottery, the development of a fine micaceous plain red ware which bears marks indicated the use of a turntable **(fig. 33.4)**. After 4000 B.C. at least 80 per cent of the pottery is wheel-thrown at Mehrgarh where we have evidence of mass production. The site is indeed blanketed by millions of shards with their decoration combining fine geometric motifs and caprids and birds **(fig. 33.5)**. Such pottery has also been produced by skilful potters whose productions are far superior to other ceramic industries elsewhere in the Indo-Iranian Borderlands and in Turkmenistan. In the same context of our Period III (*c.* 4000-3500 B.C.), cylindrical microdrills in green phtanite have been discovered. This discovery is interesting since such drills bear marks of rotation and have a small hollow at their ends which presume the use of a bow drill to drive them (Jarrige n.d.). These tools of remarkable workmanship were known only in a third millennium context, at Shahr-i Sokhta and Shahdad, but also at Chanhu-daro where Harappan bead-makers used them to bore cornelian beads. Once more, it is worth noticing that a tool, used by Harappan craftsmen and supposed to reflect their high level of technology, was already used in the lowland areas bordering the Indus Valley, at least one thousand years earlier. In one of our previous articles (Jarrige and Lechevallier 1979), we mentioned other unpublished microdrill in phtanite from Mundigak, Period I associated with potsherds identical to those from Mehrgarh.

The pottery of Period III at Mehrgarh combining two styles which were defined as Kili Ghul Mohammad and Togau style, obviously derives from the pottery of Period II and must, therefore, be considered a local development and not imported from Iran. Therefore, the earliest periods of a site like Mundigak must now be seen in a new perspective. Mundigak does not represent the eastern limit of a cultural area, including eastern Iran and Turkmenia, through which assumed superior technology and cultural features would spread with some time gap toward the Indus valley. In fact, it is just the opposite. Mundigak is a site on the western border of vast and homogeneous cultural area including central Baluchistan and the western margins of the Indus Valley, at least as far as the evidence stands now. In Period III and IV, the cultural assemblage of Mundigak is much more complex, combining, as far as crafts are concerned, various elements in common with south Turkmenian sites and eastern Iranian sites like Shahr-i Sokhta but still with a strong eastern component.

For Amri, the presence of a few unpublished microdrills in phtanite in the levels of Periods I and II is also important. They are identical with

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the specimens from Mehrgarh and Mundigak and were used with a bow drill. Casal also mentioned the occurrence at Amri in Period I, II and III, of fine bangles in ivory. A collection of broken bangles from Amri in Musee Guimet shows how skilful the craftsmen were who made these very fine ivory ornaments. The presence in levels from Period I to Period III of specialized tools like the microdrills in phtanite and of finely worked ivory objects suggests that, due to limited excavations, we possibly get a distorted image of the socio-economic organization of such sites when we assume that they were just simple farming villages. This becomes even more evident if we refer once again to our work at Mehrgarh in the context of our Period III (c. 4000-3500 B.C.). The distribution area of the pottery characteristic of Period III covers some 50 hectares, a considerable surface, with deposits limited to this very period varying between 0.50 m and 3.50 m. Even if we allow for some shifting of the settlement during the time span of Period III, it is, nevertheless, obvious that a large population lived there either on a permanent basis or on a seasonal one, since we know that today, towns and villages in Kachhi have a population largely fluctuating. according to the season.

We know for sure that crafts activities were carried on a large scale. Besides the microdrills in phtanite we have already mentioned, a fair quantity of beads in lapis lazuli, turquoise, cornelian and many other stones were found, along with fragments of bangles in conch shells, some with incised grooves displaying a remarkable workmanship. Many crucibles with copper deposits have also been found. But, in the winter of 1979-80, we were able to excavate at Mehrgarh some very interesting architecture of this period.

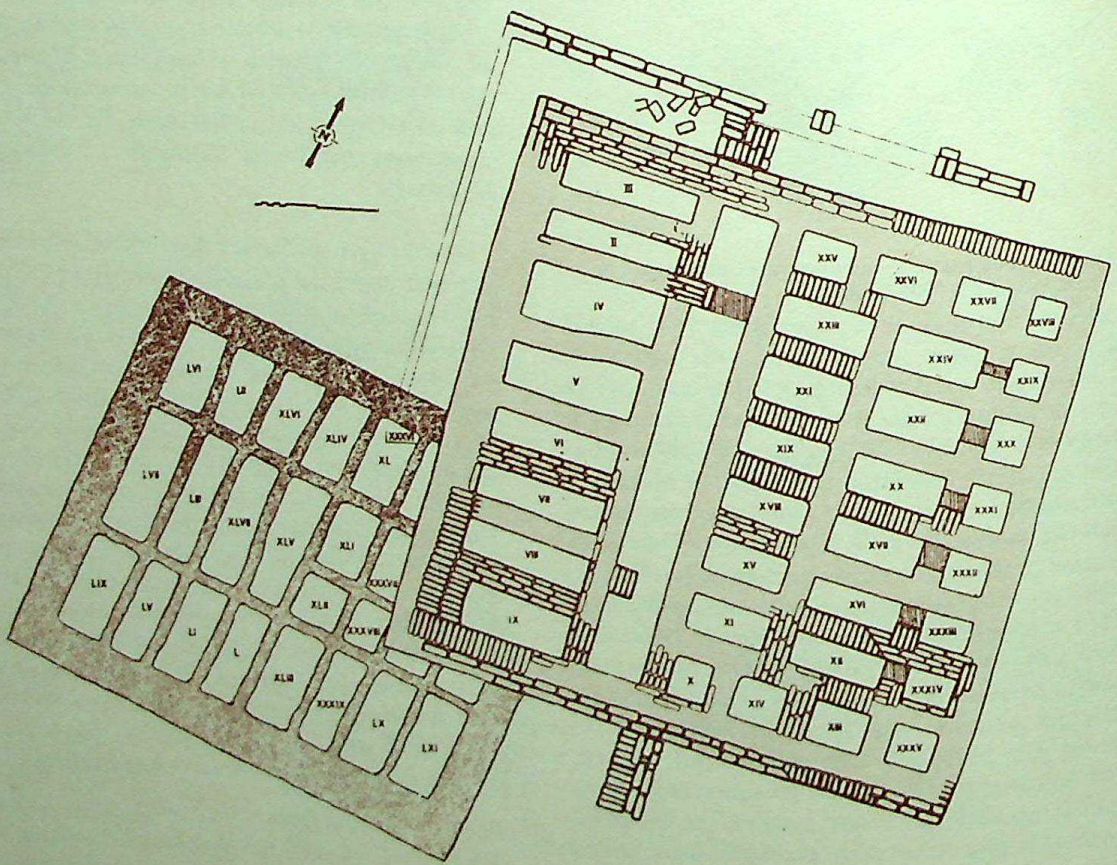


Fig.33.7. Mehrgarh: Two compartmented buildings, MR. 2 Central sector Period III (one in black, early phase, other late phase)

These buildings have a complex plan combining narrow rectangular compartments and very small square cells arranged symmetrically on either side of a corridor. The outer walls are thick, made

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of bricks laid in alternate headers and stretchers. Two such buildings have now been entirely exposed in two different areas of the settlement of Period III, their similarity is striking **(figs. 33.6, 7).** Such plans are obviously derived from earlier compartmented buildings from the Neolithic and Early Chalcolithic phases at Mehrgarh. We suggested that such buildings were used as storerooms or granaries. One can wonder if such buildings could be interpreted as a sort of prototype of the famous 'granary' of Harappa with its narrow compartments on either side of a central corridor.

Evidence from Period III shows that, in the first part of the fourth millennium, some sites, at the border of the Indus valley had probably reached a stage of increasing social complexity which was required for successfully maintaining such large
122 gatherings of population. The well-planned com-
123 partmented buildings suggest the existence of a redistribution system. The rather advanced level of technology, the fine workmanship displayed by ornaments made of raw materials sometimes imported from far away regions, are also elements supporting the idea of a settlement with a much more complex social structure than it is the case in a simple isolated farming village.

We believe that the cultural interactions between eastern Iran, Turkmenistan and Baluchistan and the Indus Valley, which became obvious after 3000 B.C. were stimulating factors for social and economic transformations in all these regions. But such interactions are now to be interpreted as the result of contacts, exchanges and even of movements of population, between areas with well established cultural traditions and not in the context of a simple diffusion. Evidence from one site, still partially excavated, is not enough to attempt a reliable study of the settlement system on the western margins of the Indus valley in the course of the sixth, fifth and fourth millennia. But at this point of our understanding, a site like Mehrgarh gives us the image of a settlement whose agriculture, craft activities, long distance contacts and planning of architecture reflect a socio-economic organization at least as complex and developed (if not more) as is the case with the villages of the Djeitun culture and subsequent phases in Turkmenistan.

We do not intent to deal here with the problem concerning the mechanisms which led from what M.R. Mughal defines as the Early Harappan phase to the urbanized 'mature Harappan' period. We believe with Fairservis, that the Kachhi plain is an area which is likely to bring interesting data about the formative stage of the classical Harappan style. We hope to understand soon, the transition between the final occupation of Mehrgarh and neighbouring 'Harappan' site of Nowsharo. Many elements clearly point out a continuity, as already seen at Amri and Kot Diji, and which will probably be evidenced at the 'Harappan' sites of the south of the Kachhi plain and in the still unexplored lower levels of Mohenjo-daro.

The purpose of this article was only to insist on the necessity of a change of perspective in our interpretation of the socio-economic achievements of the early 'towns and villages of hill and plain'. Our work at Mehrgarh indicates clearly that a better knowledge of the growth and functioning of society in the lowlands of the Indus system in the course of the millennia preceding the Indus Civilization, will lead to a new approach in determining how cities could have developed here around 2500 B.C. The rather distorted image of these early settlements which was still prevalent till not long ago, prevented South Asian archaeologists from building theoretical framework to interpret the obvious originality of the Indus Civilization.

REFERENCES

Casal, J.M. 1964. *Fouilles d' Amri.* Paris.

Dales, G.F. 1982 Mohenjo Daro: Some New Data and Interpretation. International Conference on the Harappan Civilization, Srinagar, 1979.

Fairservis, W.F. 1961. The Harappan Civilization — New Evidence and More Theory. *Novitates.* 2055; 1-35.

———. 1967. The Origin, Character and Decline of an Early Civilization. *Novitates.* 2302; 1-48.

Gupta, S.P. 1978. Baluchistan: Nuclear Area or Refuge·Zone. In *Esseys in Indian Protohistory,* D.P Agrawal and Dilip K. Chakrabarti, ed.

Hegde, K.T.M., Karanth, R.V., Sychanthavong, S.P. 1982. On the Composition and Technology of Harappan Micro-beads. International Conference on the Harappan Civilization, Srinagar, 1979.

Khan, F.A. 1965. Excavations at Kot Diji. *Pakistan Archaeology.* 2 11-85.

Jarrige, J.F. 1981 Economy and Society in the Early

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Chalcolithic/Bronze Age of Baluchistan: New Perspectives from Recent Excavations at Mehrgarh. In *South Asian Archaeology, 1979*. H. Hertel ed. Berlin.

Jarrige, J.F., Lechevallier, M. 1979. Excavations at Mehrgarh, Baluchistan: Their Significance in the Pre-historical Context of the Indo-Pakistani Borderlands. In *South Asian Archaeology. 1977*; M. Taddei. ed. Naples. 463-535.

Jarrige, J.F., Meadow, R.H. 1980. The Antecedents of Civilization in the Indus Valley. *Scientific American*. 243; 2; 122-123.

Meadow, R.H. 1981 Early Animal Domestication in South Asia: A First Report of the Faunal Remains from Mehrgarh, Pakistan. *South Asian Archaeology, 1979*. H. Hertel ed. Berlin

Piggott, Stuart 1950. *Prehistoric India*, Baltimore: Penguin.

Sakamoto, S., Gul, A., Kawahara, T. 1980. Variation and Geographical Distribution of Cultivated Plants and their Wild Relatives Native to Afghanistan. In *Preliminary Report of Comparative Studies on the Agrico-Pastoral Peoples in South-Western Eurasia*. Y. Tani. ed. Kyoto University.

Vishnu-Mittre 1974. Palaeobotanical Evidence in India. In *Evolutionary Studies in World Crops, Diversity and Change in the Indian Subcontinent*; J. Hutchinson. ed. Cambridge University Press.

Wheeler, R.E.M. 1968. *The Indus Civilization*. 3rd ed. Cambridge University Press.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

34

H.P. Francfort

The Harappan Settlement of Shortughai

Urban civilization flourished during the second half of the third millennium in the great river basins of Mesopotamia and the Indus. During the same period of time, on the Iranian plateau and in Central Asia, urban settlements developed (Masson and Sarianidi 1972; Gupta 1979).

Recent archaeological researches in Central Asia (i.e. north-eastern Iran; Soviet republics of

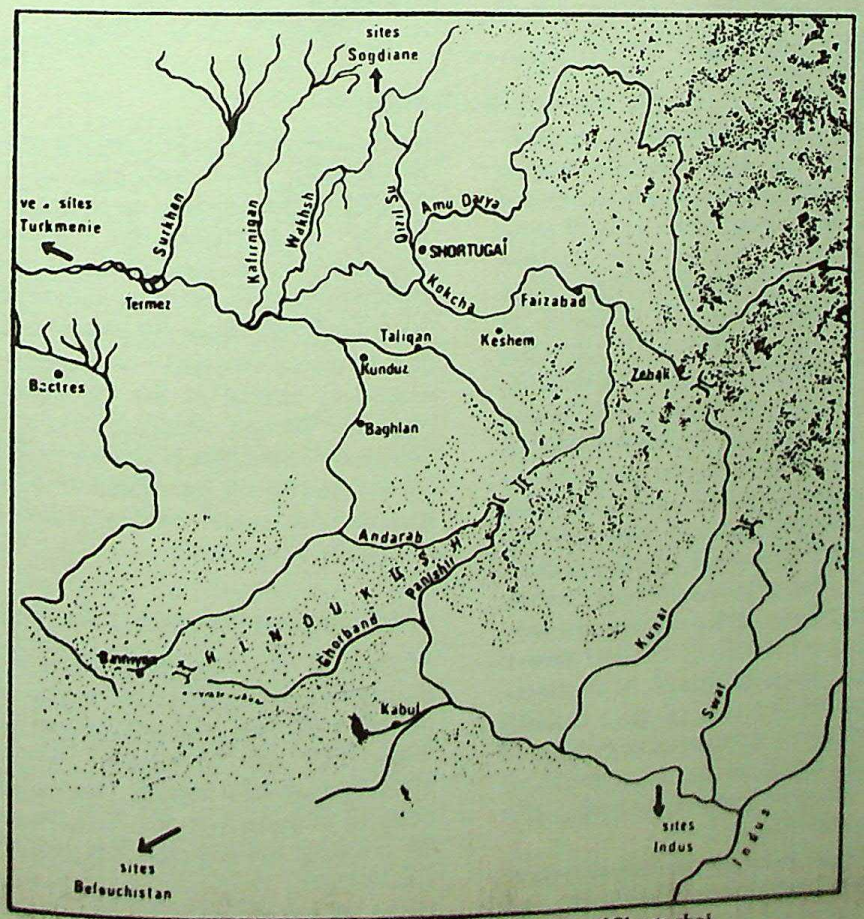


Fig.34.1. Map showing the location of Shortughai

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

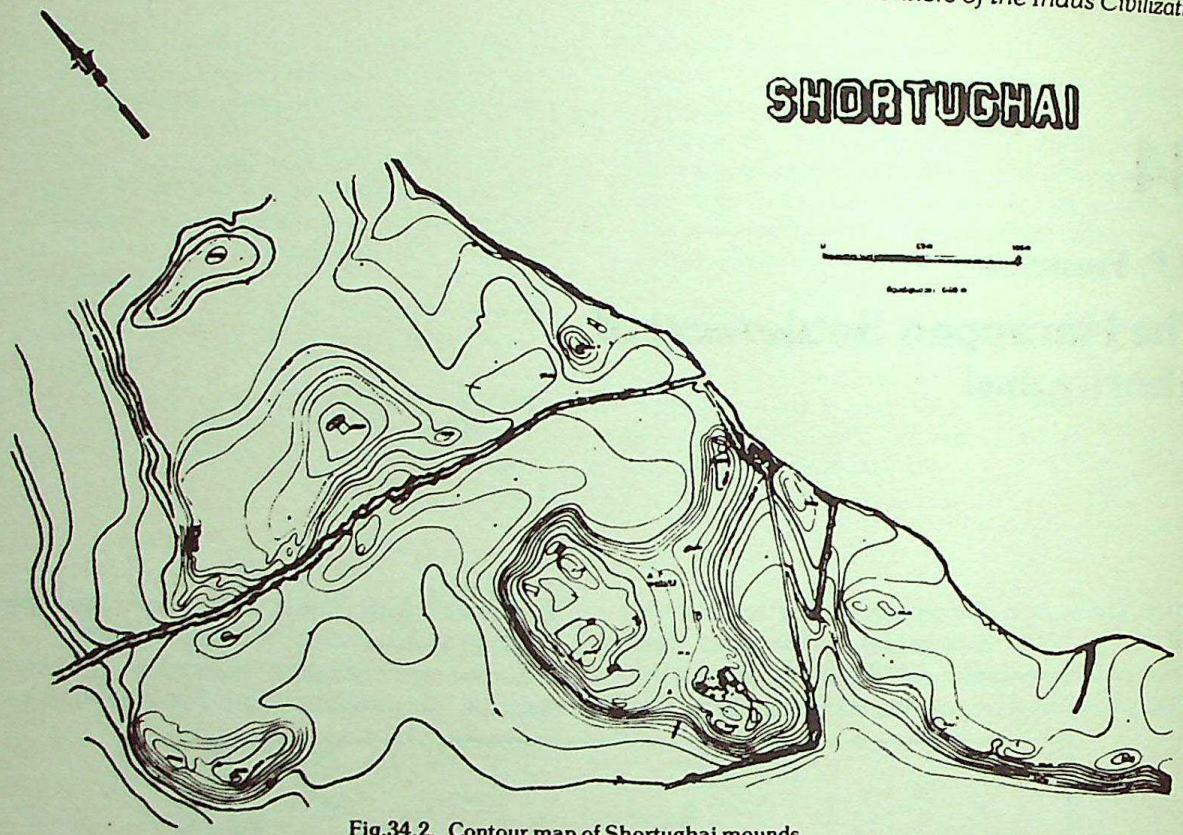


Fig.34.2. Contour map of Shortughai mounds

Turkmenistan, Uzbekistan, Tadjikistan; northern Afghanistan) brought to light sites belonging to those urban cultures. Such are the culture of Hissar in Iran (Tepe Hissar, Shah Tepe, Tureng Tepe), the culture of Namazga in southern Turkmenistan (Namazga Tepe, Ulug Tepe, Altyn Tepe, Khapuz Tepe), and the cultures of Margiana and Bactria (Kelleli Tepe, Togolok Tepe, Dashli Tepe, Sapalli Tepe). The relations between these cultures are documented, among others, by the relics of trade. Trade, in the broad sense of transport and exchange of goods, is indicated by a clear tracer: lapis lazuli (dark blue) stone. Lapis has been traced from the apparently unique mines of Sar-i Sang in Badakhshan (N.E. Afghanistan) to Mesopotamia through Bactria and the Iranian plateau, following the northern 'lapis road' (Hermann 1968: 21-51; and several others). In the Bactrian plain of northern Afghanistan, near the Amu Darya, the antiquities discovered offer strong similarities with those of Turkmenia and are analogous to those of Margiana (the Murgab delta) (Sarianidi 1977: 97-110; and several others).

East of Bactria proper is an area of mountains and valleys through which flows the Kokcha river (a left bank tributary of Amu Darya). The lapis lazuli mines are located along the upper course of the Kokcha. The small plain of Shortugai is located at the confluence of Kokcha and Amu Darya. Surprisingly, the earliest material discovered in this plain shows no relation to the Bactrian-Margian complex but to the contemporaneous but much far distant Indus Civilization. In the present paper, we propose to give (1) a general outline of the Harappan period at Shortugai (2) and compile a short account of the Harappan antiquities in Central Asia and discuss some aspects of the question of interactions between the Indus and Oxus basin civilizations during the urban period.

SHORTUGAI I : THE HARAPPAN SETTLEMENT

At present the Harappan material of Eastern Bactria has been discovered in one of the seven recorded Bronze Age settlements of the area: 'Tepe 209' or 'Shortughai' (Lyonnet 1977: 19-35; and several others). The site is located at a distance of 5 km from the Amu Darya and about 25 km from the Kokcha. It is very small (about 2.5 hectare), very shallow (no more than 2.5-3 metre of cultural deposit) and divided into two main mounds: mound A and mound B. The

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

occupation was not constant through time everywhere: at first only mound A was partially occupied (Period I). Slowly the settlement expanded, covering the whole of the two mounds A and B (Periods II and III). In the final period (Period IV) only parts of mound B were inhabited.

The layers of Period I are about 50 centimetre thick and lie on virgin soil over the entire excavated area. This circumstance implies that no one lived on this part of the plain before the Harappans. Consequently, we can eliminate the hypothesis about the presence of the formative stages of the Indus Civilization in Central Asia. All the Harappan material recovered at Shortughai belong exclusively to the mature (Shortugai Period I) and late phases (Shortugai Period II). The first period (I), mature Harappan, is dated by the material and by ^{14}C analyses to the end of the third millennium.

Ceramics: Both painted and unpainted ceramics have been discovered. All the shapes are those of the Harappan classical assemblages: jars, beakers, plates, basins, dishes-on-stand, rusticated ware—even the perforated jars, the cord impressions on jars are represented along with incised decorations on the dishes. The painted ceramics are black-on-red with typical Harappan designs: intersecting circles, pipal leaves, fishes, peacocks. They all reproduce, carefully, their Harappan models, and are not inspired by local environmental setting(e.g. pipal leaves or peacocks are not Central Asian).

Terracotta: A small group of terracotta objects include terracotta 'cakes', spoons, fragments of toy carts and the head of a figurine of the Harappan type.

Metallurgy: The copper objects discovered are not very numerous, nor very typical: a small number of pins, fragments and a discoidal mirror. More important is the discovery of clay crucibles with traces of copper inside. They attest to the existence of small-scale metallurgy (since there is no slag nor evidence of smelting of ores). Some pieces of gold and lead collected in the same layers mixed with charcoal and burned river stones complete the picture of the metallurgy. The most remarkable discovery is a discoidal gold bead perforated along its diameter.

Minerals: The Harappan people at Shortugai also utilized a variety of different minerals. The lapis lazuli, agate, turquoise, cornelian, steatite objects are similar to the products of the Indus Valley handicrafts, especially the small barrel-shaped agate beads and the long tubular and etched cornelian beads. Some unfinished cornelian beads and, above all, numerous chunks and chips of lapis give evidence for local working. Flint micro-blades and one drill-head have been found in association with lapis lazuli. The significance of these discoveries will be discussed in the last part of the present paper.

Sea Shells: A noticeable number of shell bangles made from *Xancus Pyrum* were found in the Harappan layers. They are fragments of finished objects and their presence contrasts with the absence of cheaper and easily made terracotta bangles.

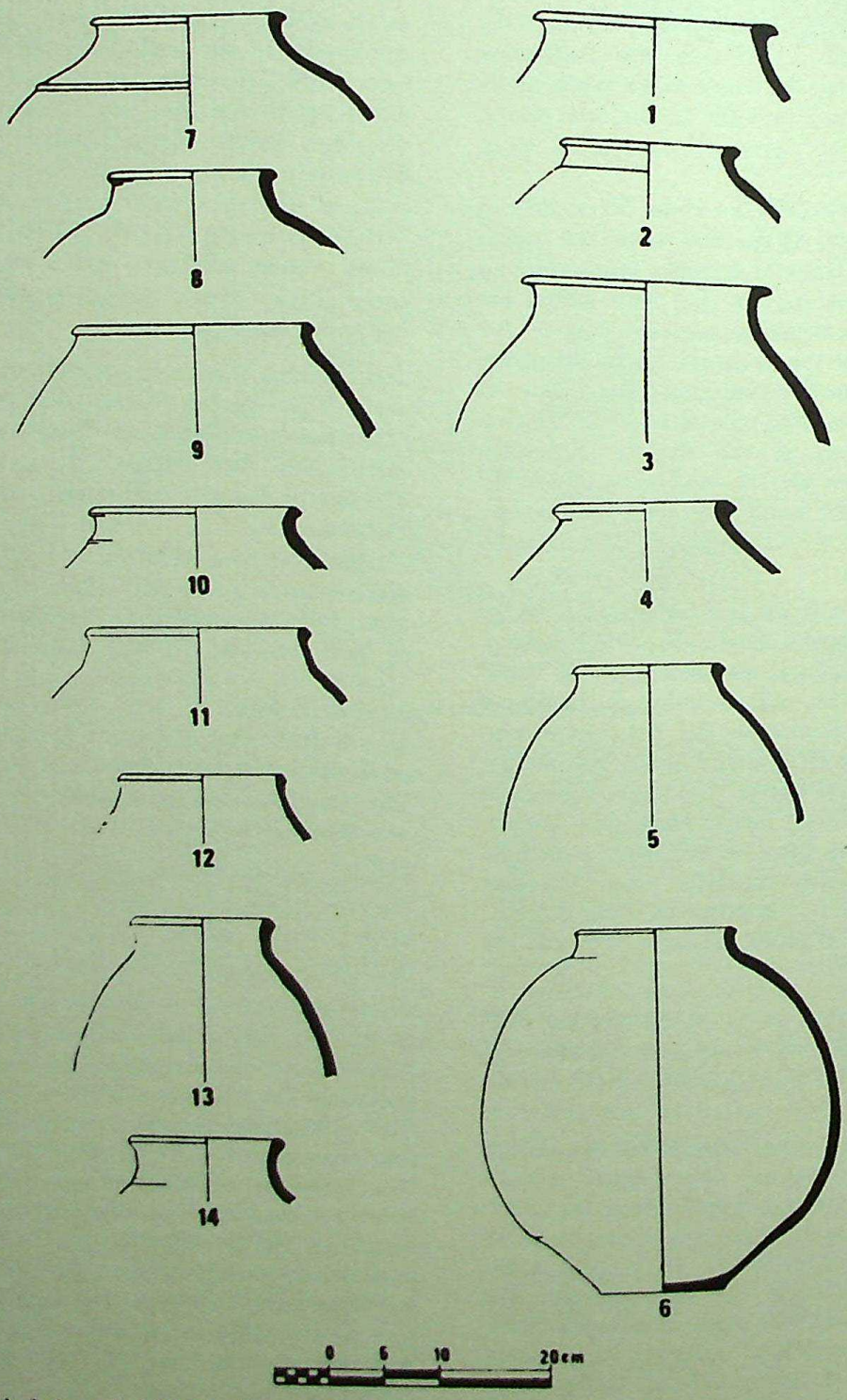
Architecture: The architectural context of these discoveries is also purely Harappan. The walls preserved sometimes up to 2 metre high are built of mud bricks of the Harappan size (*c.* 32 × 16 × 8 cm). The main walls are 1 m thick and the internal divisions of rooms made of *pise* are *c.* 50 cm thick. The uncovered buildings are only partly known by excavations but it appears that some of them were particularly well made, such as a room carefully paved with unfired bricks.

Sealing And Writing: Harappan graffiti appear on the rims of jars and on beakers. An Indus seal has been found, square in shape, depicting a rhinoceros along with Indus pictograms.

Techniques: All the above recorded antiquities of Shortugai exhibit purely Harappan shapes, sizes, proportions and decorations. The manufacturing processes also are Harappan even in the modest field of firing techniques which are well-known in the subcontinent but not recorded in Central Asia: burnt cracked pebbles have been flung on hearths to maintain heat for any domestic or artisanal use. All the artefacts and the technology from the first period of Shortugai clearly originated in the Indus Valley and nothing in those levels can be attributed to another culture or civilization. The picture, however, seems different for the subsistence economy.

Subsistence Economy: The discovery of a ploughed field covered with flax seeds in an area hardly suitable for artificial irrigation shows that

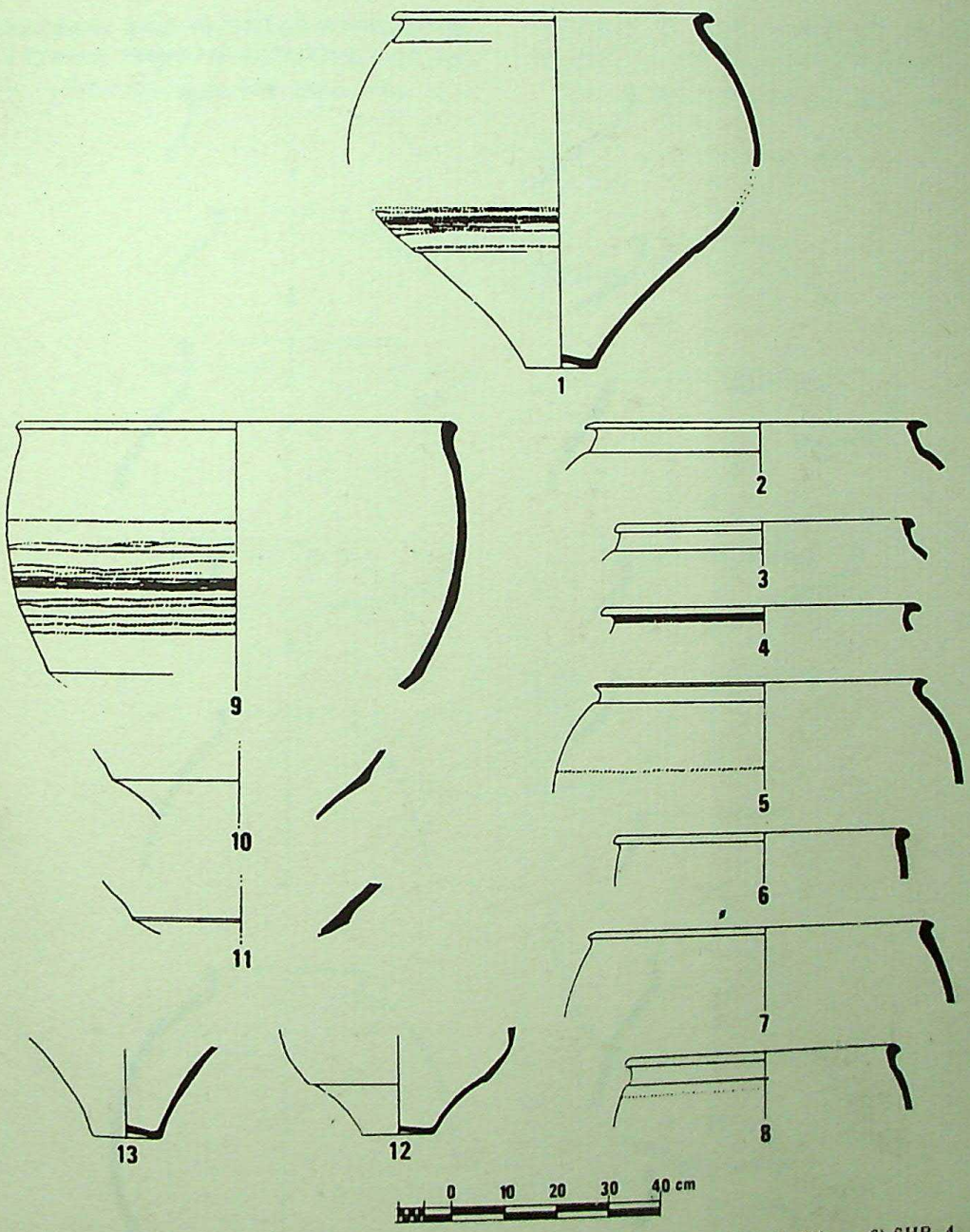
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



1) SHA, 2, I ; — 2) SHA, 2a, I ? ; — 3) SHA, 3, I ; — 4) SHA, 2a, I ? ; — 5) SHB, 3, III ; — 6) SHA, 3, II ; — 7) SHA, 2+2a, I ; — 8) SHA, 4, II ; — 9) SHA, 4, II ; — 10) SHA, 5, III ; — 11) SHA, 2a, I ? ; — 12) SHB, 4, III ; — 13) SHB, 1, II ; — 14) SHB, 3, III.

Fig.34.3. Shortughai: Pottery types, vessels

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



1) SHA, 1, I ; — 2) SHA, 1-4, I-II ; — 3) SHA, 3, II ; — 4) SHA, 2, I ; — 5) SHB, 3, III ; — 6) SHB, 4, III ; — 7) SHB, 3, III ; — 8) SHA, 5a, III ? ; — 9) SHB, 3, III ; — 10) SHB, 3, III , — 11) SHB, 3, III ; — 12) SHB, 3, III ; — 13) SHA, 2, I

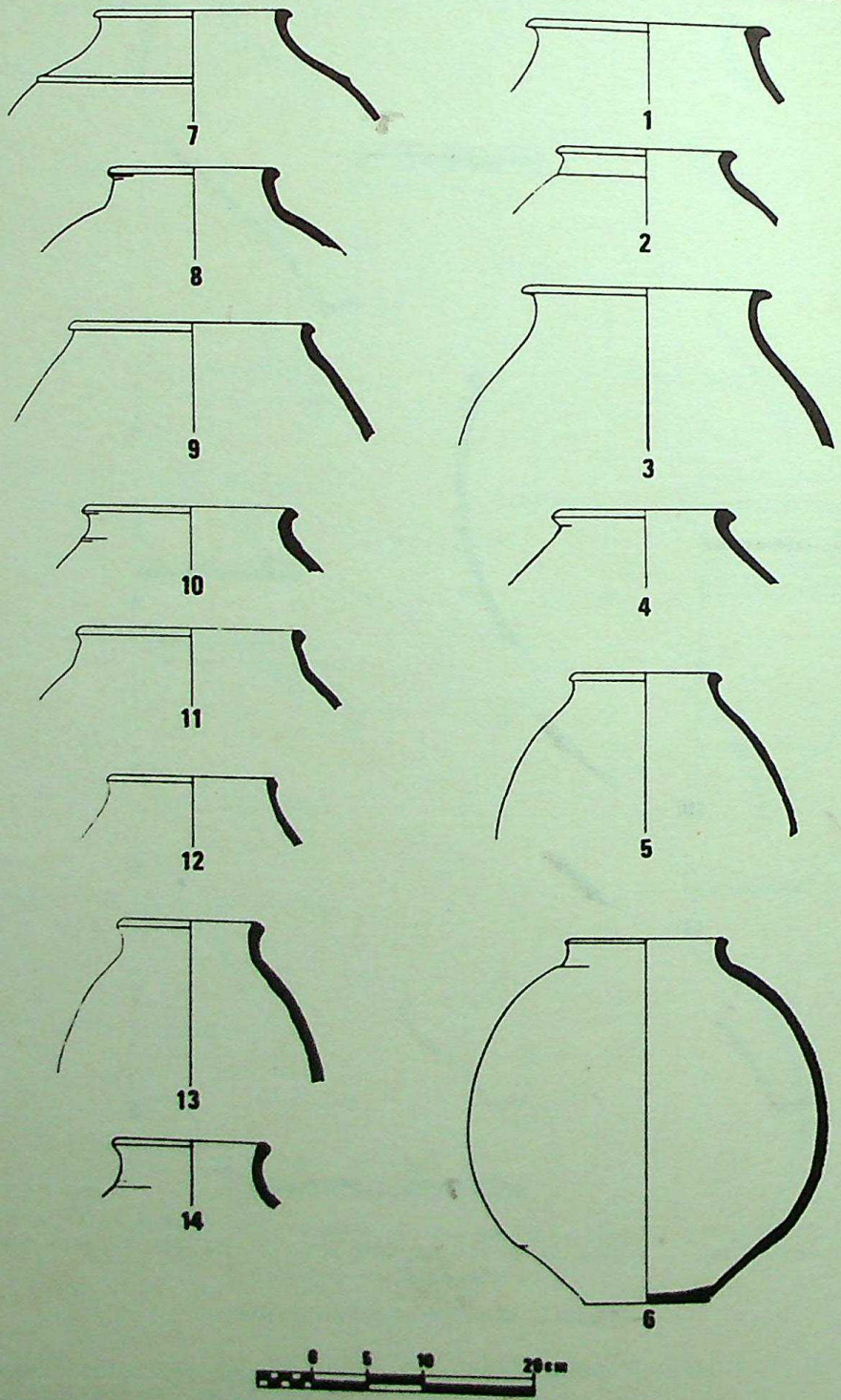
Fig.34.4. Shortughai: Pottery types, jars

dry farming took place beside irrigated cultivation.

Sondages dug in proper places revealed small irrigation canals, easily dated by the ceramics. The local environmental determinism and the researches carried out by the Unite de Recherche Archeologique No. 10 of C.N.R.S. establish the fact that the irrigation system was a highly sophisticated one (Gardin and Gentelle 1976: 59-99; and several others). The water was

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

supplied by the Kokcha river, 25 kilometres away. The skill of its layout, the way it utilized the topographical features is quite remarkable and has no equivalent in the deltaic areas of Bactria

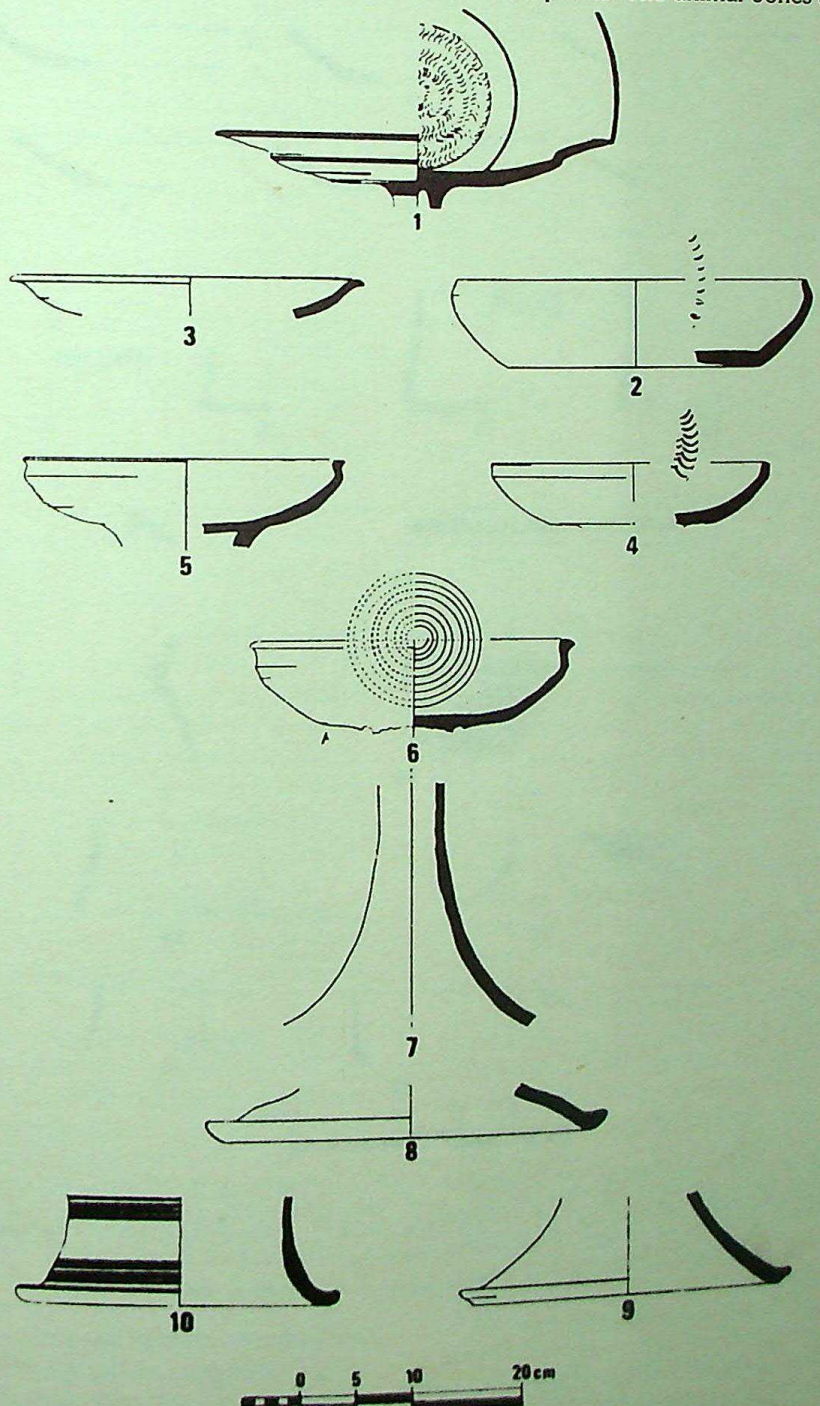


1) SHA, 2, I ; — 2) SHA, 2a, I ? ; — 3) SHA, 3, I ; — 4) SHA, 2a, I ? ; — 5) SHB, 3, III ; — 6) SHA, 3, II ; — 7) SHA, 2+2a, I ; — 8) SHA, 4, II ; — 9) SHA, 4, II ; — 10) SHA, 5, III ; — 11) SHA, 2a, I ? ; — 12) SHB, 4, III ; — 13) SHB, 1, II ; — 14) SHB, 3, III.

Fig.34.5. Shortughai: Pottery types, beakers and jars

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

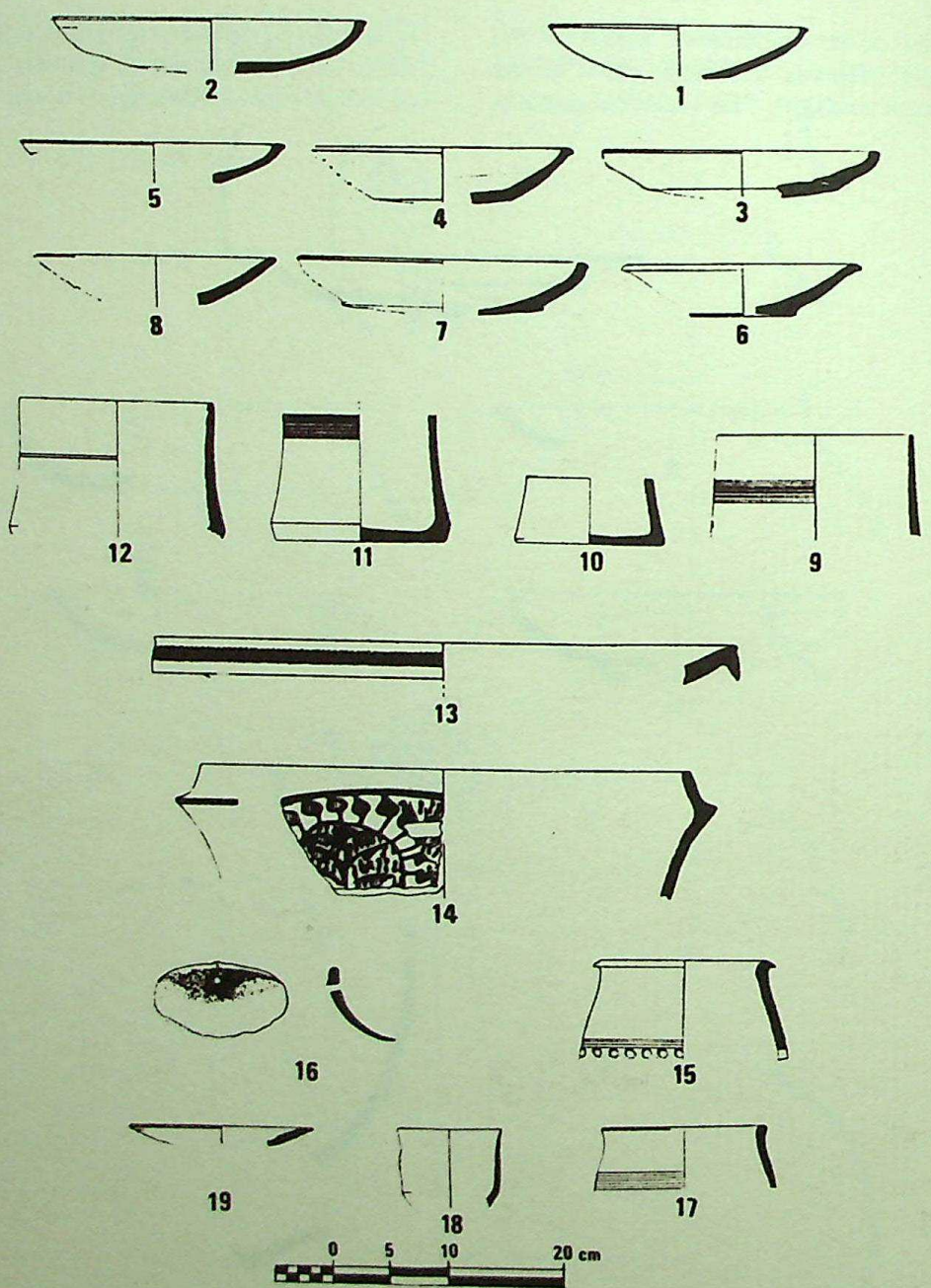
and Margiana or in the flooded plains of the Indus. Such an irrigation technique could be the result of a local tradition. The botanical remains recovered by floatation of ashes indicate the cultivation of a Central Asiatic species rather than that of Indian plants. The animal bones are presently



1) SHA, 1+1a, I ; — 2) SHA, 6, III ; — 3) SHA, 1a, I ? ; — 4) SHA, 5, III ; — 5) SHA, 5, III ; 6) SHA, 5, III ; — 7) SHA, 1a, I ? ; — 8) SHA, 3, II ; — 9) SHA, 1, I ; — 10) SHA, 3a, II ?.

Fig.34.6. Shortughai: Dishes-on-stand

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



1) SHA, 1a, I ?; — 2) SHA, 5, III; — 3) SHA, 6, III; — 4) SHA, 6, III; 5) SHA, 2a, I ?; — 6) SHA, 2, I; — 7) SHA, 2a, I ?; — 8) SHA, 2a, I ?; — 9) SHA, 4, II; — 10) SHB, 4, III; — 11) SHA, 4, II; 12) SHB, 3, III; — 13) SHA, 1a, I ?; — 14) SHA, 1a, I ?; — 15) SHA, 6, III; — 16) SHB, 2, II; — 17) SHA, 6, III; — 18) SHA, 4, II; — 19) SHA, 6, III.

Fig.34.7. Shortughai: Pottery; various types

being studied.

Interactions Between Indus and Oxus Basin Civilizations

A small number of Harappan and Harappan-related objects have been found in Central Asia, in Turkmenia and in Bactria.

In Turkmenia, on the site of Altyn Tepe (period Namazga V) we note the discovery of ivory objects and etched cornelian beads, apparently of Indus origin. Thin discoidal ivory and 'steatite' beads as well as two square stone seals of Harap-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

pan shape carved with Harappan-like motifs and pictograms show some relation with the Indus world. Finally, bronze and silver *cloisonne* seals depicting three-headed mythic animals are analogous to the three-headed monsters of the Indus. Agate beads, similar in shape and colour to the beads of Shortugai and the Indus fig. have been found in graves, especially No. 60 (Gupta 1979).

It is thus generally assumed that the Namazga V Turkmenia and the Harappan Indus were contemporary and interacting (Asthana 1976: 68-70; and many others).

In Bactria some analogies have been noticed between the Dashli material and the post-Harappan Jhukar; and some Harappan-related antiquities are also present.

First, numerous similarities between Bactrian and Harappan copper objects deserve special study. One example will illustrate the problem: a very particular cosmetic copper flacon, with a chequered body is exactly similar to one found in the Harappan levels of Chanhu-daro (Sarianidi 1979: 645-46, fig. 1, no. 6). Small kidney-shaped steatite vessels by their form recall the Harappan world; one of them bears pipal leaves as incised decoration (Sarianidi 1979: fig. 5, no. 16). Fragments of alabaster decorative plates, found in the first occupation level of the Dashli 3 'Palace' depict trefoils and a humped bull fig. in a manner foreign to the Central Asiatic or Iranian artistic world (Sarianidi 1979: fig. 5; no. 17).

According to a recent information, Harappan stone seals and etched cornelian beads have been found in the looted graveyards of Bactria (Tosi 1979: 164, fig. 3).

Thus Harappan presence in Central Asia is evidenced by the Shortugai I settlement and by antiquities from Turkmenia and Bactria. What are the implications of this evidence for the relations between Central Asia and the subcontinent?

As a matter of fact nearly all the evidence of Harappan relations with the West has been brought to light to foreign territories (the Persian Gulf, Mesopotamia, Iran) and *not* in the Indus territories (Lamberg - Karlovsky 1972: 226). Consequently, we have an unbalanced picture of those relations. If trade was the type of relation between the Indus and Oxus basins, we must determine the nature of the goods exchanged. Cornelian and agate beads, ivory and a handful of objects d'art have come to Central Asia. Is that all? It is difficult to admit. Did the Harappans, during the Shortugai I period, entirely control the lapis resource of Badakhshan and its supply to Central Asia and the West (Gupta 1979: 258)? Copper is one possibility. However, we cannot ascertain this at the present stage of investigation, in spite of the Shortugai crucibles and the flourishing state of the Bactrian metallurgy. The question of trade with Central Asia is complicated by the vast extent of the Harappan territory and the various possible routes betwen the two regions: Seistan, the Herat area, the Hindu Kush and Badakhshan are all parts of the problem (Dales 1977: 72-78; and several others).

REFERENCES

Amiet, P. 1977. Bactriane proto-historique, *Syria*, Vol. 54, 1-2; 89-121.

Asthana, Shashi 1976. History *and Archaeology of India's contacts with Other Countries from the earliest times to 300* B.C., Delhi.

———1979. Harappan interests in Kerman, *Man & Environment Vol. 3, 55-60.*

Dales, G.F. 1977.*Shifting Trade Patterns between the Iranian Plateau and the Indus Valley in the third millennium B.C.; Colloques internationaux du C.N.R.S. n·567. La plateau iranien et L8 Asie centrale des origines a la conquete islamique*, Paris, 72-78.

Deshayes, J. 1977. A propos des terrasses hautes de la fin du IIIe millenaire en Iran et en Asie contrale, *Colloques internationauz du C.N.R.S. N 567 Le plateau iranien et l' asiecentrrale des origines a la conquete islamique*, Paris; 108-111.

Francfort, H-P. (n.d) Shortughai: an Indus Valley settlement on the river Oxus, *Archaeology* (forthcoming):

———1981. The late periods of Shortughai and the problem of the Bishkent Culture, in *South Asian Archaeology 1979;* H. Hartel ed. Berlin.

Francfort, H.P. & Pottier, M.H. 1978. Sondage preliminaire sur l' etablissement protohistorique harappeen et post-harappeen de shorttugai (Afghanistan du N.E.); *Arts Asiatiques;* Vol. 34, 29-69.

Ganjalin A.F. 1967. Raskopki v 1959-1961 gg na Altyn-Type. *Sov. Arkh.* 4; 207-219: (fig. 6, p. 216 ivory objects from hoards).

Gardin J.C. 1981. L' archeologie du paysage bactrien, *Comptes rendus des seances de l' Academie des Inscriptions et Belles-Lett-res 1980, Paris: 480-501.*

In Gardin, J.C., and Gentelle, P. 1976.*Irrigation et peuplement dans lapliane d' Ai Khanoum de L'epoque achemenide a 1'epoque musulmane. Bulletin de 1'Ecole Francaise d' Extreme-Orient.* 63; 59-99.

———1979. L'exploitation du sol en Bactriane anti-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

que. *Bull. de l'Ecole Francaise* d' Extreme-Orient. 66; p. 1-29.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia, and the Indian Borderlands,* Vol. II, New Delhi.

Gupta S.P. and Schtenko, A.Ya. 1968. New evidence of the Harappa Culture in Soviet Central Asia. *Bharati,* (Bull. of College of Indology, Banaras Hindu University), Nos. 10-11, 194 ff.

Herrman, G. 1968. Lapis lazuli: the Early Phase of its Trade, *Iraq* Vol. 30, 21-57.

Kohl, P.L. 1978. The Balance of Trade in south-western Asia in the mid-third millennium B.C., *Current Anthropology.* Vol. 19, 463-92.

Lamberg-Karlovsky, C.C. 1972. Trade mechanism in Indus-Mesopotamia interrelations, *Jr. of the American Oriental Society,* Vol. 92, 226 ff.

Lyonnet, B. 1977. Decouverte de sites de la age du bronze dans L' Afghanistan du N.E., *Annali dell' Instituo Orientale di Napoli; Vol. 37, 19-35:*

Masson, V.M. 1976. *Protogorodskaja civilizacija juga Srednej Azii, Sov. Arkh.,* 4,3-22 (fig. 6, p. 9 beadsand ivory objects, fig. 7, p.10 beads and square seal).

———1977. *Vestnik drevnej Istorii,* 4, 147-55 (proto-Indian seals from Altyn-Tepe).

Masson, V.M. and Sarianidi, V.I. 1972. *Central Asia: Turkmenia before the Achaemenids,* London.

Piperno, M. & Tosi, M. 1973. Lithic technology behind the ancient lapis lazuli Trade, *Expedition,* Vol. 16; 15-23.

Sarianidi, V.I. 1971. Lapis lazuli Route in the Ancient Near East, *Archaeology,* 24, 12-15.

———1977. (a) *Drevnie zemledel'cy Afghanistana,* Moscow.

———1977. (b) Bactrian Centre of Ancient Art, *Mesopotamia,* Vol. 12; 97-110.

———1979. New finds in Bactria and Indo-Iranian Connections, in *South Asian Archaeology 1977,* M. Teddie ed. Neples.

Shaffer, J.G. 1978. *Prehistoric Baluchistan,* Delhi.

Tosi, M. 1974. The Lapis Lazuli trade across the Iranian Plateau in the third millennium B.C. *Gururajamanharika Studi in Onore di Giueseppe Tucci,* Vol.I. Neples, 3-22:

———1979. Proto-urban cultures of Eastern Iran and Indus Civilisation, In *South Asian Archaeology 1977,* M. Teddie ed. Naples (fig. 3) 164.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

35

J.C. Gardin

Canal Irrigation in Bronze Age Eastern Bactria

In their overviews of the history of Central Asia in ancient times, authors from different countries (Biscione & Tosi 1979; Gardin 1982; Gupta 1979; Khol 1981; Masson 1964; Masson & Sarianidi 1972) seem to agree on at least one thing, namely the need to expand the data base upon which this history is being built. Excavations and surveys have been carried out in large numbers during the last thirty years in all parts of the vast territory currently designated Central Asia: the Soviet Republics of 'Srednjaja Azija' (Kirghizia, Kazakhastan, Uzbekistan, Tadjikistan, Turkmenia), eastern Iran, Afghanistan, northern Pakistan, northern India, western China (Sinkiang). Yet, this territory is so large that our archaeological image of it is still in the nature of an archipelago of settled areas scattered in an ocean of emptiness: clusters of sites are known in each area, ranging from prehistoric to modern times, but they are separated by vast stretches of blank spaces which are archaeologically 'empty', solely by virtue of the fact that they have remained, to this day, unexplored, or not explored properly (Barthod 1968).

Such was the case of eastern Bactria until quite recently. For several decades, the French Archaeological Delegation in Afghanistan hoped to discover traces of the splendour that was Bactria in Hellenistic times, according to the evidence of Greek and Oriental sources, as well as of the wealth of Graeco-Bactrian coins which found their way to antiquarians and museums in the nineteenth and twentieth centuries. No significant discoveries were made on the site of Bactria itself, however, notwithstanding a large number of deep soundings (Schlumberger, in Gardin 1957: 9-13). The major breakthrough came only in the 1960's, when the French mission was authorized to undertake excavations on another large site of Graeco-Bactrian times, which had been visited more than a hundred years earlier by John Wood (1872), an English traveller, much further to the east, near the present village of Ai Khanum (Schlumberger and Bernard 1965; Bernard *et al* 1980).

From this time onwards, the French Archaeological Delegation concentrated its effort on this unique, long forgotten city, so vast in size that several decades would be needed for the entire excavation of all its monuments, as for the many contemporary urban sites of comparable importance in the Greek world (Bernard 1980). However, some attention was paid also to the surrounding area—where traces of ancient canals had been observed by John Wood and his later successors—with a view to gaining an idea of what the countryside looked like under the rule of the Greek city.

A survey was, therefore, carried out in the small triangular plain which extends east and north of Ai Khanum, bordered by a range of hills and two rivers: the Oxus, or Amu Darya, and its major tributary from the South, the Kokcha (**fig. 35.1**). Traces of rural settlements contemporaneous with the Greek city were, indeed, found in abundance, in the form of hundreds of hamlets or isolated farms located away from the rivers, in the vicinity of irrigation canals of considerable size which were thought initially to be the product of Greek expertise and Bactrian labour (Gardin &

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Gentelle 1976). This somewhat ethnocentered interpretation soon proved to be wrong: a second, more thorough survey of the same area showed that the plain had been irrigated long before the Greeks decided to build a major city there: not only were the major 'Greek' canals already in existence in Achaemenian times, or even earlier, in the 1st millennium B.C., but one of them at least had to be assigned to the Bronze Age, as early as the turn of the 3rd to the 2nd

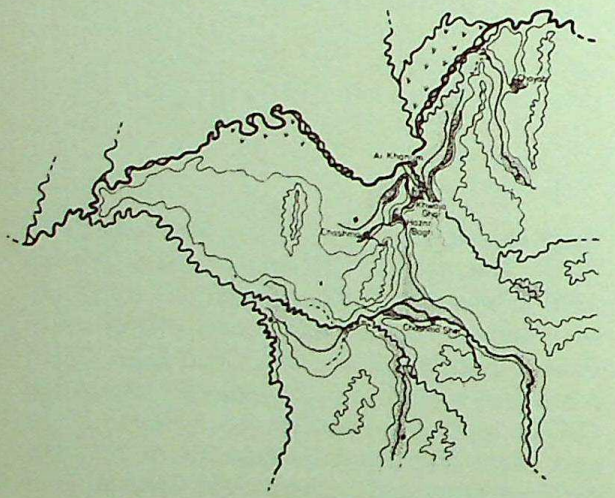


Fig.35.1. Bactria: The region of Ai Khanum

millennium, in conjunction with the unexpected discovery of Harappan sites in the area (Lyonnet 1977).

A wealth of information was thus obtained in a short lapse of time (three seasons, 1974-76) and at relatively small cost, through surveys only, on the history of the settlement in this part of eastern

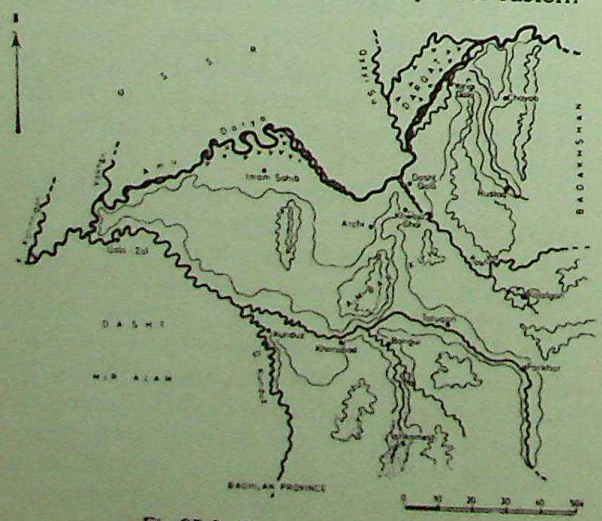


Fig.35.2. Bactria: Explored sites

Bactria during the last 4,000 years. from the Bronze Age to the Islamic period (Gardin & Gentelle 1979). An authorization was then requested from the Afghan government to continue the survey over a broader area, extending along the left bank of the Amu Darya between the desert known as the Dasht-i Mir Alam to the west, which separates eastern and western Bactria **(fig. 35.2)**, and the Hindukush mountains to the south and to the east, which separate eastern Bactria from the Indian borderlands and from the Tarim Basin, respectively **(fig. 35.3)**. Unfortunately, the recent course of events in Afghanistan forced us to interrupt our work after two seasons only (1977-78), when large areas still remained to be explored both south of Kunduz, in the Baghlan province, and east of Rustaq, in Badakhshan. Even so, scores of new data were reaped which provide a good basis, both in quantitative and qualitative terms, for a tentative reconstruction of the major phases of settlement in eastern Bactria after the Lithic Age, within the territorial limits just indicated.

A preliminary report has already been published on the subject (Gardin & Lyonnet 1978-79). The purpose of the present paper is to amplify and, in some cases, modify the picture given in our previous publications, regarding the circumstances which led to the shifting of settlement patterns in eastern Bactria, and their relation with comparable movements in other parts of Central Asia during the Bronze Age.

Observation Strategy

Let us first summarize the way in which our survey was conducted and the resulting limitations on the nature of our data. The goal of the survey was not an inventory of ancient sites, but a reconstruction of the history of settlement in the regions under study. Previous work in the Ai Khanum plain had shown that the two things are not necessarily related.

One should first bear in mind that the recording of all sites in a given area, combined with a systematic collecting of surface potsherds, may still fail to provide a reliable picture of land occupation in ancient times. This is especially true in regions where post-depositional factors have been not only active, but active in ways which vary according to time and place, to the point of barring any straightforward interpretation of distributional patterns and their evolution. Eastern

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Fig.35.3. Bactria: Geographical setting

Bactria is a region of this kind, for two reasons. For one thing, some areas have been subject to agriculture or grazing for very long periods, others to development programmes such as road

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

building or large-scale irrigation which have caused the disparity of archaeological sites from the surface in varying proportions; whereas other regions have only been settled for relatively short periods (e.g., Hellenistic, Early Islamic), and have remained untouched ever since. Obviously, the interpretation of differences in site distributions, as observable today, should give some consideration to such factors. Then, natural agents should be brought into play, namely alluvion and erosion, which are known to be both very active in the Bactrian plain and foothills, but again in varying proportions according to local environmental features (relief, soil, wind, hydrology). Indeed, the thickness of natural deposits covering ancient sites assigned to the same period has been shown to vary from 1 to 6 or 7 metres *in the same area*, depending on the location of the sites within that area. Since it is usually impossible to estimate such variations on the basis of surface observations alone, the interpretation of site distributions in such a context would seem to be either unfounded or beyond our reach.

Further, the recording of all sites is not only deceptive, but also unnecessary in the present case, to the extent that we can take advantage of the presence of surface remains of another kind, namely irrigation canals. The superiority of canals over sites as indicators of settlement are, in the Bactrian context at least, self-evident. Our initial survey in the Ai Khanum plain had shown that the major canals built in ancient times were very large: their overall length range between 25 and 30 km; their width, banks included, often reaches 30 metres; while the banks themselves, accumulated over long periods sometimes rise up to 8 metres above the present level of the plain. The post-depositional factors mentioned above, both human and natural, certainly affected canals as much as sites; but since their strength varied considerably from one area to another, the risk of total disparition is less in the case of a given irrigation system extending over a wide surface. This was confirmed in our subsequent surveys of the major irrigable areas in eastern Bactria: all of them still bear scattered remains of irrigation works built over 2,000 years ago, which are more than sufficient for reconstructing the overall design of each independent system, whereas traces of ancient sites are sometimes quite scanty.

Another reason for giving some priority to the recording of canals is that maps of ancient irrigation systems are an efficient means of interpreting an archaeological landscape, which is not always true of maps of ancient sites (Gardin 1980 b). By 'efficient', I mean here both productive and economical. Irrigation maps are productive in the following sense: the range of inferences which can be drawn from them is quite broad, from the more straightforward estimations of cultivated surfaces, with their demographical correlates, to the higher speculative constructs of the 'hydraulic society' sort (Wittfogel 1956). Maps of sites do not lend themselves as readily to such interpretations, despite the *formal* virtues of spatial analysis techniques (Hodder and Orton 1976), for the simple reason that the data base is usually too weak from a *semantic* or *pragmatic* viewpoint, to support non-trivial interpretive statements[1].

As for the economical side of efficiency, it lies in the fact that irrigation maps can be obtained in a very short time over relatively large areas, where maps of sites would require many more days or weeks of fieldwork. The reasons for this may not be self-evident; let us summarize them briefly. When recording remains of ancient canals in the Ai Khanum area, we were struck by the remarkable stability of their course through time. Not only did we find examples of irrigation systems abandoned for several centuries, and later re-used exactly along the same pattern; we also observed the continuation of the same phenomena to this day, when modern canals are being dug parallel to ancient ditches, if not actually in them. One of the inferences to be drawn from this, obviously, is that no major tectonic changes have occurred since the first irrigation systems were built in the region. In other words, in order to bring water to a given area, the hydrological and topographical constraints that have to be considered, are much the same today as they were 5,000 years ago. This highly important point was confirmed in many different ways. First, heads of ancient canals are usually located quite close to the present ones; recent attempts at following more advantageous course, intended to reach higher parts of the sloping terraces which form most of the irrigable areas in eastern Bactria, have ended up in failure. Also, the memory of the courses followed by ancient canals is still amazingly alive in the country, even where traces of them have almost totally vanished; in fact, we often had to rely on local informants to confirm the reality of our tentative

134 136 137 138 140 138 140 141 142

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

restitutions, when we found them so bold as to distrust them. Lastly, the coincidence of past and present ditches proved to be a common rule throughout the many separate irrigable areas which constitute eastern Bactria, rather than a chance exception in only one of them.

This fact has a direct bearing on the design of observation strategies: it means that only a few traces of ancient canals are needed for the restitution of their full length on the basis of present topographical data, including the existence of modern canals in the vicinity, if there are any. The extreme application of this principle consists in giving a high priority to the exploration of areas where existing canals come to an end—the so-called *payab* to which local informants often refer when describing traditional irrigation systems, past and present (litterally, 'the end of water'). If ancient ditches are found there, one can safely restitute the whole course of the corresponding canal(s) upstream, without spending much time on the location of other traces of the same irrigation work(s) between the *payab* and the source river, 20 or 30 kilometres away, except by way of confirmation. By following this strategy of 'purposive selection' as opposed to truly statistical sampling procedures [2], we were able to considerably cut down the time needed for plotting ancient irrigation maps: errors are surely present in all of them as far as linear courses are concerned, but they do not affect, in any significant way, the computation of irrigated surfaces, which is the main goal of the exercise.

Once these maps have been drawn, the remaining task is to assign dates to each irrigation system. The only realistic way to do so is by dating archaeological sites located in the vicinity[3], on the assumption that they are contemporaneous with the irrigation works upon which they were dependent. Other methodological issues could be raised at this stage, regarding the definition of vicinity and dependance, or the postulated relation between canals and sites located in the same area. Suffice it to say here that answers have been given to these very real questions, leading to purposive selection procedures of the same brand, as above, for minimizing the number of sites which had to be visited in order to date a given irrigation system.

The basis of our datings was, as one might expect, surface collection of potsherds. Nothing will be said here of the ceramological component of our study, since it has already been outlined elsewhere (Gardin & Lyonnet 1978-9: 108-123). Let us merely stress the size of the collected material—ca. 25 tons—as well as the long range of time which it covers, from c. 3000 B.C. to this day. For the purpose of the present paper, we have chosen to consider only the Bronze Age rather than giving an account of each of the fifteen periods recognized in the evolution of pottery (**fig. 35.4**). An additional restriction should be mentioned: nothing will be said either of the characteristics of individual sites, even though many of them show intrinsic features which have a bearing on the characterization of settlement and its evolution[4]. The following account should, therefore, be considered as a highly condensed version of the final story which we hope to tell in a forthcoming publication, on the basis of a much broader and finer spectrum of data, palaeo-environmental as well as archaeological.

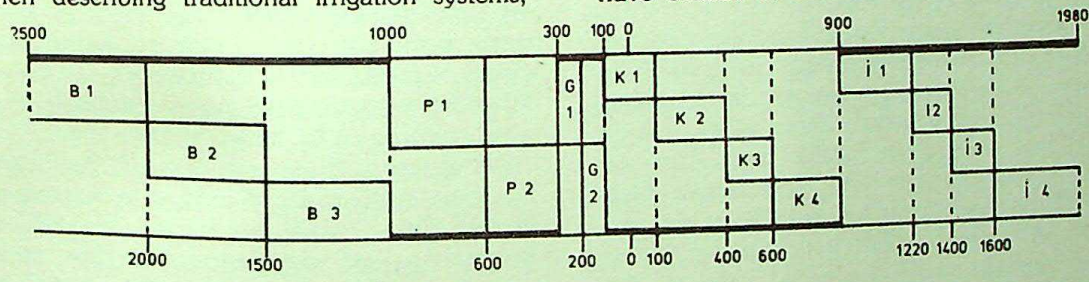


Fig.35.4. Bactria: Chronological table

THE BRONZE AGE

The earliest traces of settlement have been found in the Taluqan area, in the form of potsherds attributed to the first half of the 3rd millennium. This dating is the result of a recent study of Bertille Lyonnet (1981), based on comparisons with mostly unpublished material from sites in south-west Afghanistan, Baluchistan and—to a lesser extent—the Indus Valley. The pottery in question, is a coarse ware tempered with sand, hand-made but with traces of the use of a slow

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

wheel for shaping the rim; the outer surface is often granulated, or faceted as if it had been smoothed by successive strokes, using a small scraper. The shapes are monotonous: close vessels of medium size, with an out-turned rim, or open bowls, with straight walls and rims. Parallels have been found by Bertille Lyonnet in Mundigak (level III), Baluchistan, Amrit and Kot-Diji; the contemporaneous material from Turkmenia (Namazga III-IV), seems to be different, at least as seen through what has been published. The provisional interpretation, pending an opportunity to study unpublished collections from Soviet Central Asia, is that people from the Indian borderlands migrated as early as the beginning of the 3rd millennium B.C. towards the Amu Darya basin, and settled in eastern Bactria, in the Taluqan area.

The sites on which potsherds from that period have been collected are located some quite close to the Taluqan river on the right bank, others inland, close to the piedmont zone which extends to the north-east of the Taluqan plain. A stream flows in this zone, the Rud-i Shahrawan, which looks like a natural river, judging from its breadth, slope, and speed (and also from its name: *Rud* = river, whereas canals are called *nahr*, cf. the Nahr-i Shahrawan in the Imam Sahib area further to the north. Yet, this *rud* is in fact artificially derived from the Taluqan river, so much so that the light constructions of pebbles and branches which are used for this purpose, at the head of the Rud-i Shahrawan, have to be rebuilt every year at low ebb, failing which the *rud* dries up completely. Judging from the position of some of our sites inland, up to 5 or 6 km from the Taluqan river, it seems fair to assume that this derivation was first invented by the new settlers, in the beginning of the 3rd millennium B.C. This canal was then of a limited scope: it did not run northwards to the Amu Darya, across the foothills of the Ambar Koh, as the present Rud-i Shahrawan does **(fig. 35.5)**, but flowed back to the Taluqan river, after having irrigated only the lower part of the Taluqan plain.

This construction admittedly rests on a narrow basis: half a dozen sites, and about a hundred shards; the restitution of the canal, in particular, may seem somewhat bold. It is, however, strengthened by the fact that artificial irrigation is definitely present in the following period, in the Shortugai area (see below), to a degree of technical sophistication which would seem to imply some previous experience with the derivation of canals over relatively long distances (*c.* 12 km for the estimated course of the earliest Rud-i Shahrawan, as drawn on **fig. 35.6**).

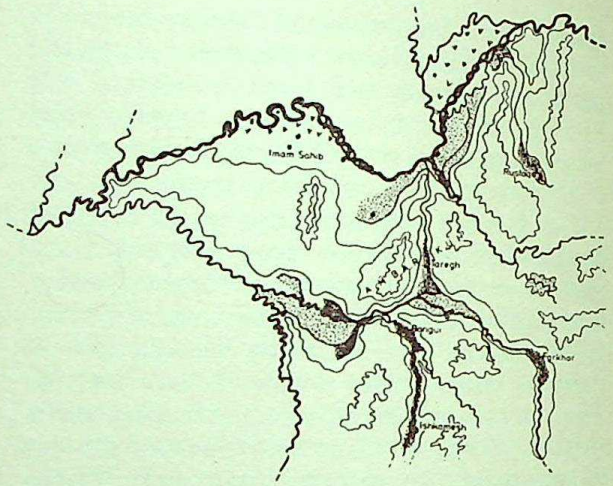


Fig.35.5. Bactria: Bronze Age Canal system

Let us turn to this later evidence, further north. Shortugai is the name of a village in the plain of Dasht-i Qala, where we located, in 1975, a Bronze Age site with two mounds (five other mounds of the total of seven belonged to later cultures), which we regarded as part of a Harappan settlement, on the basis of surface pottery (Lyonnet 1977). Again, the hypothesis of artificial irrigation had to be formed, on the basis of the same postulate as above: given the semi-arid climate which we consider to have established already in the 3rd millennium[5], it is unlikely that people would settle away from natural sources of water (rivers or springs), except in artificially irrigated areas. The Shortugai sites, although not very far from the Amu Darya (*c.* 2-3 km), were therefore interpreted as part of a broader settlement of the Bronze Age on the plain of Dasht-i Qala, which came into existence in the second half of the 3rd millennium B.C., when a major canal was built in order to bring water to the whole area **(fig. 35.6)**.

Objections to this restitution were not lacking: first, the fact that only two or three other Bronze Age sites had been found in the southern part of the plain; second, the technical difficulties involved in bringing water from the river bed to the higher terraces in which the Shortugai sites are located; third, the dimensions of such a project, in both a physical and a socio-political sense,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

which seemed to exceed the potential or needs of the very small village communities observed in the Shortugai area. Yet, an empirical verification was provided by the excavations conducted on one of the Shortugai sites by H.-P. Francfort, from 1976 to 1979: soundings were made on the supposed course of our hypothetical canal, which confirmed its existence as well as its early date, in the Harappan period of the site[6]. We are thus led to the picture of a sudden introduction of rather sophisticated irrigation techniques at a time and in a region where nothing of the sort would have been expected only a few years ago.

One way to explain this phenomenon is by relating it to the arrival of Harappan settlers already acquainted with irrigation technology, or by an expansion northwards of the people, also of Indian origin, who had settled a few centuries before in the Taluqan area. The two movements probably concurred; but neither of them should be understood as a colonization of hitherto barren. uninhabited land. True, we have not found a single trace of pre-Bronze Age settlements in our whole territory; we should, however, remember that the survey began with the lowland plains, in areas where artificial irrigation was feasible, whereas the foothill zones were to be explored later. Had we been able to complete this last part of our programme, we would probably have found chalcolithic or neolithic sites in the highlands, where they are usually located in Central Asia. Our picture of the evolution of settlement in eastern Bactria would in that case, be somewhat more balanced, with: (a) an initial phase down to the 4th millennium B.C., when permanent settlements developed mainly in the foothills, where water was available and vegetation present,[7] or on the lower terraces of the Amu Darya where they were broad enough to provide a sizeable ecological niche,[8] the higher terraces and piedmont zones being then unoccupied, if not necessarily unused (dry farming, grazing); (b) a subsequent phase beginning in the 3rd millennium B.C., when the lowlands (terraces) gradually became the major settlement areas, for a variety of possible, non-mutually exclusive reasons—anthropic or natural degradation of the foothills; the arrival of new settlers from the Indian borderlands, bringing with them irrigation skills that were essential for the agricultural development of semi-arid plains; the opening of new routes for the trade of lapis lazuli and other precious stones or metals between the Badakhshan mountains and the Turanian plains, etc.

The Shortugai sites were abandoned in the first half of the 2nd millennium B.C., when population movements from northern Bactria and beyond seem to take place in the area, according to H.-P. Francfort's observation (1981 b). Much has been written on the evolution of the settlement in those times throughout 'Turan' (Biscione and Tosi 1979; on the adequacy of the 'Turanian' reference in this case, see Kohl in this volume-eds.), with an emphasis on the so-called crisis which is supposed to have stopped the progress towards urbanization, in the second half of the 2nd millennium. Our data in eastern Bactria for this period are not such as to prove or disprove the reality of those views: changes do occur in settlement areas, but they can be interpreted in different ways according to one's preferences for explanatory patterns of any given brand or school[9]. I shall, therefore, merely enumerate those changes as we now see them, with the hope that further studies of our material, coupled with carefully selected comparative data from other regions of Central Asia, will eventually allow historical explanations of a firmer sort.

Potsherds of the same period as Shortugai (*c.* 2400-1800 B.C.) have been found in other areas: **(fig. 35.6)** *(a)* Taluqan, where there is no sign of discontinuity between the earlier settlement of the 3rd millennium and its evolution in the 2nd millennium; *(b)* the plain opposite Taluqan on the left bank of the river, where a canal was probably active in the 2nd millennium, close to the major Bronze Age site found in that area (indicated on fig. 5 as fortified in the Iron Age); *(c)* the Kunduz-Khanabad plain, where irrigation of the lower terraces of the Taluqan-Khanabad river is relatively easy; and *(d)* the plain of Archi, to the north, with two Bronze Age sites located so far inland (5 and 10 km from the Amu Darya) that it seems fair to postulate the existence of a major canal then, contemporaneous with the symmetrical canal on the opposite side of the river Kokcha **(fig. 35.6)**.

Traces of Bronze Age settlements have also been found in the Kalafgan area, which lies on one of the roads connecting the Amu Darya with Badakhshan **(fig. 35.6)**. The number and nature of the shards collected on those sites do not warrant very narrow chronological attributions. However, one point emerges clearly, namely the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

fact that there was no general regression of irrigated agriculture in eastern Bactria after Shortugai was abandoned.

Shifts in settlement may nevertheless have taken place then, following a pattern which will be observed several times in later periods, as the centre of gravity moves from the Amu Darya basin to the Kunduz plain, or conversely. Judging from the size of the site now known as the citadel (Bala Hissar) of Kunduz, where we collected quite a number of Bronze Age shards,[10] we may assume that its importance goes back to the 2nd millennium; it may even have been already fortified then (as hypothesis embodied in **fig. 35.6**). The development of the Kunduz region as the major centre of settlement in eastern Bactria, which is an established fact in the Iron Age, should then be regarded as an earlier process, already begun in the late Bronze Age. An argument in favour of that reconstruction is the fact that one of the piedmont zones which surround the Kunduz-Khanabad plain, namely the Asqalan terrace north of Kunduz, was irrigated for the first time during that period **(fig. 35.6)**. Granted that the irrigation of such zones has a special meaning for the interpretation of settlement patterns (Gardin & Lyonnet 1978-79: 126-8), we may infer that the 'Asqalan project' of the late 2nd millennium had much the same significance as its modern counterpart (Government of India 1970), regarding the place of the Kunduz region in the agricultural and demographic development of eastern Bactria.

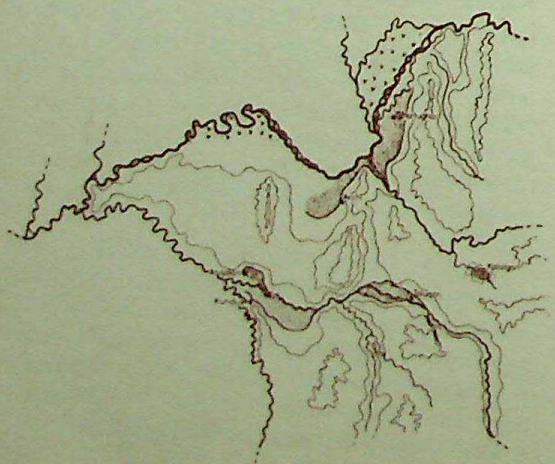


Fig.35.6. Canal near Shortughai

NOTES

1. This is not the place to demonstrate this point: for a general discussion of the contrast between formal sophistication *vs.* logical or semantic weaknesses in archaeological reasoning, See Gardin 1980 a: 120-7.

2. 'Purposive selection' is the expression used by George Cowgill to indicate the kind of observation procedures which he finds preferable to sampling — as I do — 'whenever selection is feasible, sufficient for one's research objectives, and not wasteful' (Cowgill 1975: 260). Whether such procedures still deserve to be called statistical is another matter, which I do not regard as terribly important in this case, nor in any other.

3. An alternative method consists in digging trenches across individual ditches in the hope of recovering shards of some chronological significance. Fifteen such trenches have indeed been dug, but for purposes other than dating alone; they either confirmed previous chronological attributions derived from surface shards on related sites, or failed to prove any reliable evidence against such attributions.

4. Descriptions and plans of these major sites have been given to W. Ball for advanced publication in his *Archaeological Gazeteer of Afghanistan*, forthcoming (1982).

5. By which we do not mean to say that the natural milieu had the same desert-like features as it has today, in the plain **(fig. 35.2, 4)** as in the foothills **(fig. 35.6)**: in fact, a careful study of the present landscape, combined with data from soil and plant analysis in the Shortugai area (by J. Trichet and G. Wilcox, respectively), leads to a somewhat different picture (this study is being conducted by F. Orazie-Vallino and C. Marinucci). The general climate conditions, however, were probably not very different from today (Gentelle, in Gardin & Gentelle 1979: 2-8), so that the effect of water constraints on site location would not be very different either. The distribution of modern villages is quite significant in this respect: when located away from the rivers, they are close to an irrigation canal of more or less recent date; conversely, no such villages existed inland prior to the digging of those canals. This last point can be checked both through local informants and by the study of the maps drawn *c.* 60 years ago for Koshkaki's *Rahname-ye Qataghan wa Badakhshan* (Reut 1979), especi-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ally in the area under discussion: Vol. I, pp. 236-7 (*s.v.* Kakol, a village near Shortugai), and Vol. III, map no. 35.

6. Harappan shards were found in the banks of the lower canal in a series of three superimposed ditches, all dated in the Bronze Age (Francfort 1981a:).

7. As for instance on the flattened summit of the Ambar Kuh, where springs and cultivated fields are said to be abundant; or again in the Rustaq highlands, where small villages exist to this day, relying in part, on large 'snow holes' for the supply of water. In both cases, the hypothesis is that the foothills were not then barren as they are today and that they constituted a suitable habitat during the long transitional period from hunting and gathering activities alone to the full-blow grown of irrigated agriculture and herding. The palaeoecological evidence in support of this view will be presented in the final publication of the Bactrian survey, in preparation.

8. As for instance in the islands of Darqau, very close to Shortugai **(fig. 35.2)**, which are known to contain large numbers of ancient sites, but which we have, unfortunately, not been allowed to visit.

9. This assertion, far from being an expression of skepticism is the product of investigations into eral (Gardin 1980a: 90-101), or to the 'Turanian' data base in particular (Tosi and Gardin, in preparation).

10. The Bala Hissar of Kunduz has been visited many times by archaeologists working in Afghanistan, through the last decades (see the long bibliography compiled by Warwick Ball 1982, under 'Qunduz-Bala Hissar'). The date usually assigned to it was the Kushan period (see, for instance Mizuno 1962: 79), however, we collected large quantities of shards over the whole surface of the site, which suggest a continuous occupation from the Bronze Age to the Islamic period.

REFERENCES

Barthold, W. 1968 *Turkestan down to the Mongol Invasion*. 3rd. ed. London: Luzac & Co.

Bernard, P. *et al.* 1980. Campagne de fouille 1978 á Ai Khanoum (Afghanistan). *Bulletin de l'Ecole Francaise d'Extreme-Orient*; t. LXVIII; 1-103. (1978 was the last year of work on the site; earlier reports are mentioned in that article).

Ball, W. (in collaboration with J.-C. Gardin) 1982. *Archaeological Gazeteer of Afghanistan*. 3 vol. Paris: A.D.P.F. (Association pour la Diffusion de la Pensee Francaise).

Biscione, R., and Tosi, M. 1979. *Protostoria degli stati Turanici*. Suppl. no. 20 agli *'Annali'*; Vol. 39; fasc. 3; Naples.

———. 1981 a "Shortughai: an Indus Valley Settlement on the River Oxus. *Archaeology*. (forthcoming).

———. 1981 b. The Late Periods of Shortughai and the problem of the Bishkent Culture. In *South Asian Archaeology 1979*; H. Hertel ed. Berlin: Dietrich Reimer Verlag.

Garden J.-C 1957. *Ceramiques de Bectres*. Mem DAFA; t. XV. Paris; Klincksieck.

———. 1980 a. *Archaeological Constructs*. Cambridge University Press and Paris: Maison des Sciences de l'Homme.

———. 1980 b.. L'archeologie du paysage Bactrien. *C.R.A.I.*; 480-501.

———. 1982. Asie centrale Paris: *Encyclopedia Universalis*. in preparation.

Gardin, J.-C. et Gentelle, P. 1976. Irrigation et peuplement dans la plaine d'Ai Khanoum, de l'epoque achemenide a l'epoque musulmane. *B.E.F.E.O.*; t. LXIII; 59-99.

———. 1979. L' exploitation du sol en Bactriane antique. *B.E.F.E.O.*; t. LXVI; 1-29.

Gardin, J.-C. et Lyonnet, B. 1978-9. La prospection archeologique de la Bactriane Orientale (1974-1978: premiers resultats. *Mesopotamia*; t. XIII-XIV; pp. 99-154; pl. I-Xi.

———. 1980. Prospections de la Delegation Archeologique Francaise en Afghanistan sur le portour de l'Hindu Kush, 1948-1950 (In preparation).

———. 1981. Ceramique et chronologie des chateaux de l'Hindu Kush central. In M. Le Berre, *Les chateaux de l'Hindu Kush Central*. Paris: Mem. DAFA. t. Geuthner. (forthcoming).

Government of India, Ministry of Irrigation and Power, Central Water Commission 1970. *Project Report on Khanabad-Alchin Project, Khanabad River Basin, Kunduz Province (Afghanistan)*. New Delhi: October 1970.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia, and the Indian Borderlands*. 2 vol. Delhi: B.R. Publishing Corpn.

Hoddar, I. and Orton, C. 1976. *Spatial Analysis in Archaeology*. Cambridge University Press.

Kohl, P. 1982. Prehistoric Turan and the Problem of Cultural Diversity. In the present Volume.

———. 1981. *The Bronze Age Civilization of Central Asia: Recent Soviet Discoveries*; P. Kohl ed. New York: M.E. Sharpe.

Lyonnet, B. 1977. Decouverte de sites de l'age du

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

bronze dans le N.E. de l'Afghanistan: leurs rapports avec la civilisation de l'Indus. *Annali dell' Istituto Orientale di Napoli.* Vol. 37; 19-35.

———. 1981. Etablissements chalcolithiquues dans le Nord-Est de l'Afghanistan: leurs rapports avec les cultures du Bassin de l'indus. *Paleorient;* fasc. 2 (in print).

Masson, V.M. and Sarianidi, V.I. 1972. *Central Asia: Turkmenia Before the Achaemenids.* London: Thames and Hudson.

Schlumberger, D. and Bernard, P. 1965. Ai Khanoum. *Bulletin de Correspondance Hellenique.* Vol. LXX-XIX; fasc. 2; 590-655; pl. XXV-XXVI.

Wittfogel, K.A. 1956. The Hydraulic Civilization. In *Man's Role in Changing the Face of the Earth.* W.L. Thomas ed. University of Chicago Press.

Wood, J. 1872. *A Journey to the Source of the river Oxus.* Karachi: Oxford University Press. 1976.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

36

Philip Kohl

Prehistoric 'Turan' and Southern Turkmenia: the Problem of Cultural Diversity

In his discussion on the origins of the Indus Valley Civilization, Mortimer Wheeler (1968: 24) emphasized the distinctive character and autonomy of the prehistoric cultures of the Indo-Iranian borderlands. He wrote:

> Throughout this complex process of intermiglement, one factor is liable to be underrated by those in search of origins: the high importance of the *genius loci* which, from place to place amidst hill-divided communities, is a factor constantly to be reckoned with. In the quest for far horizons there is always the risk of tripping over the pebbles at one's feet. And in the last resort it is the astonishing individuality of these upland cultures which is their attractive and revealing quality.

This paper will not focus on the subjective aesthetic attractions of these cultures, nor will it review recent evidence, such as the determination of an aceramic neolithic horizon at Mehrgarh in Baluchistan (Jarriage and Lechevallier 1979) that is relevant to this search for origins. Instead, it will discuss a related problem that seems to contradict Sir Mortimer's impression of cultural diversity; the appearance of complex societies in southern Central Asia and on the Indo-Iranian borderlands in the late fourth through third millennium B.C.

The recent discovery of 'Harappan' seals at Altyn-depe in southern Turkmenia (Masson 1977) and 'Harappan' trading (?) and mining (?) settlements north of the Hindu Kush on the Shortugai plain of north-eastern Afghanistan (Lyonnet 1977; Francfort and Pottier 1978) significantly increases the evidence for contact and exchange between Central and South Asia during the Bronze Age (Schetenko 1970, 1974). A re-examination of the archaeological data from regions immediately west and north of South Asia should help us evaluate more accurately the endogenous and exogenous factors that helped shape the Harappan culture.

Prehistoric 'Turan'

In a series of recent articles, M. Tosi (1977, 1979, n.d.) has utilized the later referent 'Turan' to define an area stretching from the Damghan plain of north-central Iran in the west to Iranian Seistan and the lower Helmand valley in the south to southern Turkmenia in the north (**fig. 36.1**). The fourth and third millennia cultures which existed throughout this vast area were participants in the Turanian interaction sphere; later, for the second millennium, Turan encompasses an even greater area that includes ancient Margiana or the Murghab delta and northern and southern Bactria as far east as the Shortugai plain (Tosi 1977: fig. 1, 47-48). This huge area supposedly represents a region of 'protohistorical cultural integration' which developed in great part due to certain environmental constraints, such as a relatively uniform floral distribution and common climatic, orological , and hydrological conditions. Tosi (1979: 153) explicitly denies that the concept 'Turan' refers to any socio-political entity, such as Sumer or Elam, but rather:

> would remain tightly restricted to define a spatial convergence of morphological similarities among basic items of material culture and certain patterns of socio-economical adaptations documented by the subsistence production and dependent from a high degree of uniformity in ecosystemic conditions . . . .

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

In his own words, the term refers to a multi-cultural 'interaction sphere' encompassing four primary areas that were integrated in the late fourth and third millennia:

(1) southern Turkmenia — including both the Kopet Dagh foothills and the Serakhs and Tedjen deltas;
(2) the Atrak valley in Iranian Khorasan — stretching west to the Misrian plain and east to Meshed on the Kashaf Rud;
(3) the eastern Elburz ridge — including eastern Mazanderan province and the Gurgan and Damghan plains;
(4) the Helmand valley — extending from the southern Hindu Kush to Iranian Seistan.

within these regions. For our purposes it is largely irrelevent that Masson utilizes Childe's criteria to document an 'urban revolution' at Altyn-depe, while Tosi modifies these same criteria and accepts Johnson's (1973) definition of the State to prove its existence in prehistoric Turan.[1] As such, the concept of a prehistoric Turan usefully distinguishes the Bronze Age culture north and east of the great Iranian deserts from those further to the west or in South Asia. More specifically, the cultures of Turan are opposed to those now documented for the southern Zagros at sites, such as Malyan, Yahya, or Shahdad;[2] the Persian/Arabian Gulf, including the coastal sites of Oman and the Umm an-Nar culture; and the

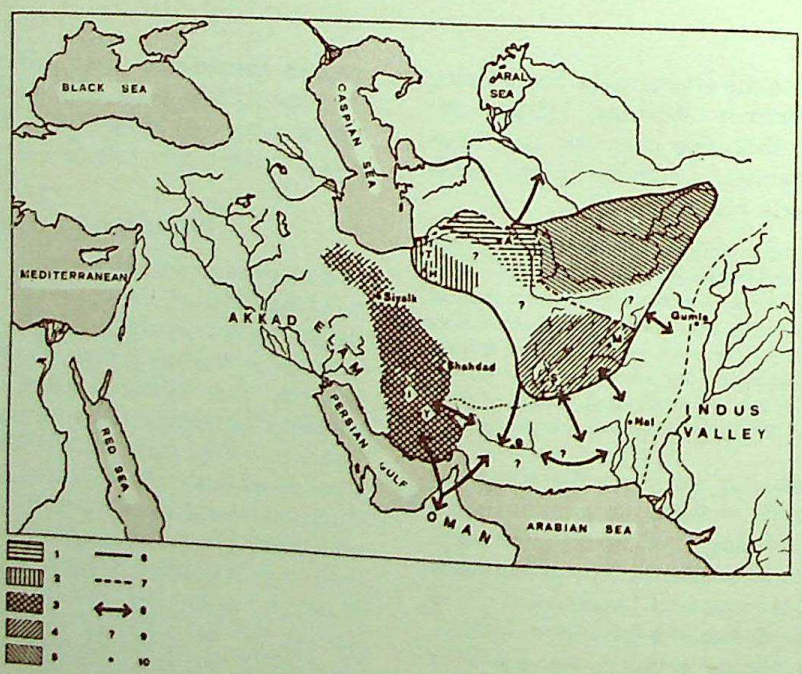


Fig.36.1. Map of Turan & neighbouring areas

Since the term 'Turan' has been introduced into the literature and runs the danger of being reified or made real without serious scrutiny, it is necessary to critically examine the virtues and drawbacks of Tosi's definition.

One of the primary reasons for lumping the four regions mentioned above together is to emphasize the scale and complexity of the prehistoric developments that occurred within them. Following the lead of Masson (1967; Masson and Kyatkina 1976) for southern Turkmenia, Tosi is concerned with demonstrating that complex class-stratified societies independently emerged

Baluchistan orographic belt defined as a region extending from the Bampur valley in the west to the small upland valleys containing numerous late fourth and early third millennia cultures immediately west of the Indus plain.

Tosi is certainly correct in emphasizing that recent archaeological work has demonstrated that Turan was not a cultural backwater or vacuum during the fourth and third millennia. He has summarized clearly the evidence for urban centres in which large numbers of people were concentrated at sites such as Shahr-i Sokhta, Namazga-depe, Altyn-depe, and Mundigak; the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

existence of monumental architecture at Altyndepe, Tureng Tepe, and Mundigak; and full-time craft specialization at the urban centres in southern Turkmenia and at Tepe Hissar and Shahr-i Sokhta. That significant and large-scale developments occurred throughout this huge area during this period most likely would be admitted by all scholars familiar with the material, but this archaeologically established fact by itself is irrelevant to Tosi's contention of a Turanian interaction sphere. Other evidence must be cited to show that this area exhibited more intensive contact and cohesion among its various sub-regions than with neighbouring areas.

The distribution of elaborately carved stone vessels, some of which were produced at Tepe Yahya (Kohl 1978), supports a distinction between developments west of the great Iranian deserts with those further east. The distributional evidence for these particular indices of long-distance exchange suggests the presence of networks linking sites in south-eastern Zagros to the urban centres of Mesopotamia and Khuzestan;[3] such routes probably led both through the mountain valleys and plains of southern Iran and along the Persian/Arabian Gulf. Only sporadic finds of these vessels, such as a single isolated surface example from Shahr-i Sokhta (Kohl 1979: 68, fig. 12) or the unique fragment from the lower levels of Mohenjo-daro (Mackay 1935: pl. 0, 2), exist east of the Iranian deserts; consequently, their main value lies not in the reconstruction of ancient exchange relations but in the more mundane task of establishing synchronisms across the void of the Dasht-i Lut and Dasht-i Kavir. The method of producing soft-stone, particularly chlorite, artefacts in the workshops at Yahya differed considerably from that employed at Shahr-i Sokhta (Kohl in press). The Shahr-i Sokhta production was based upon an entirely different chipped stone technology; namely, one in which drills were extensively employed to form elaborate geometric designs on compartmented seals (Piperno 1973).[4] Moreover, these seals are distributed from southern Turkmenian sites south to those in the Helmand valley, while they are totally absent at Tepe Yahya in the Kerman province. Metallurgical analyses of artefacts from Shahr-i Sokhta and different sites west of the desert on the Iranian plateau emphasize the distinctiveness of the former site where implements were hammered from cast ingots (Heskel, personal communication); although to our knowledge a comparison of metallurgical techniques and artefacts between sites on the Iranian plateau and those in southern Turkmenia has yet to be made, the integrity of the objects from the latter region and, at least stylistically, their similarity to artefacts from the Helmand valley (cf. the analyses of Terekhova 1975) is clear. The miniature stone columns, whose function may be ideological,[5] links the sites from Hissar, southern Turkmenia, including the Sumbar valley (Khlopin personal communication) south to Afghan Seistan (Dales 1977); utilizing such objects one could plausibly reconstruct a separate sphere of exchange that would unite the sub-regions of Turan and set them apart from contemporaneous culture further west. Biscione (1973: 114) has established that a minimum of 25 per cent of the ceramics from the earliest levels at Shahr-i Shokhta have direct south Turkemenian parallels; such Geoksyur-related pottery is not found in southern Iran, west of the Dasht-i Lut. All this evidence tends to support Tosi's belief in more intensive contact within Turan than between it and the outside world. It is clear that one useful function of the concept of a prehistoric Turan is its sharp distinction between cultures situated on either side of the Iranian deserts.

Another virtue of Tosi's concept is his emphasis on the peculiar environmental features[6] that distinguished Turan from neighbouring areas, particularly from the large alluvial plains of Mesopotamia and the Indus Valley. As defined, Turan is largely land-locked with access only via the Misrian and Gurgan plains to the Caspian Sea. Regional differences are described and environmental similarities that characterize, for example, the concentration of settlements in the land-locked Murghab and Tedjen deltas with the Helmand basin, are carefully elaborated. These observations are important not only for reconstructing past subsistence practices throughout Turan, but also for guiding research and future surveys in sub-delta regions, like those on the Dorungar river in the Darreh Gaz plain (Kohl and Heskel n.d. a and b) or along the Tedjen near Serakhs on the Iranian-Soviet border east of Meshed. Settlements in such areas should be more concentrated than in intermontane valleys, such as those formed by the Atrek and Sumbar rivers, or in largely waterless

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

plains, such as the Arghiyan and Isfarayin regions in western Khorassan (Spooner 1965: 97).

We still must detemine, however, whether Turan defines in area of 'protohistorical cultural integration' or whether its regional differences overshadow and undercut these observed similarities. We will proceed first by noting some of the logical difficulties with this defined area, a process which involves a more critical review of some of the archaeological evidence cited above. Then, we will examine two sub-regions of Turan, southern Turkmenia and the eastern Elburz, to illustrate how the limits of Turan break down both within each sub-region and in relation to contiguous non-Turanian regions. Finally, we will return to our original problem and attempt to determine the relevance of the impressive Bronze Age developments in southern Central Asia and the Indo-Iranian borderlands for the beginnings of the Harappan culture.

Arbitrary Limits

As defined, Turan is both culturally and geographically diverse. The question, then, immediately arises why some regions, such as the Quetta or Bampur valleys, are excluded and others, which are not bounded by major geographical barriers, like the Damghan plain on the central Iranian plateau, are not extended further to encompass more distant regions. In other words, if examined closely, arbitrary geographical limits have been imposed on an area which is then labelled 'Turan'. Moreover, if we look at the material cultural remains connecting the third millennium Turanian sites and compare these with the links that can be established between individual Turanian sites and adjacent settlements just beyond the limits of the Turanian interaction sphere, we find that frequently the latter demonstrate far greater interaction than the former. Thus, for example, the links tying Hissar on the Damghan plain with Sialk located on the Iranian plateau near Kashan or Shahr-i Sokhta in the Seistan with the largely unexcavated settlement of Bampur to the south are far stronger than any ties connecting Shahr-i Sokhta directly to Hissar.[7] There is practically no overlap in the pottery from Hissar with that from Shahr-i Sokhta. Although both sites processed lapis lazuli, detailed analyses of the chipped stone tools from Hissar (Bulgarelli 1974: 26-27; Biscione *et al* 1974: 44) show a clear divergence in basic types, as indicated, in particular by the high presence of burins in the Hissar assemblage, while at Shahr-i Sokhta drill-heads were obtained from highly standardized microblades. Strong ceramic parallels tie Hissar with sites, like Shah Tepe, and Tureng Tepe in the Gurgan plain, which, in turn, can be connected to recently discovered or published materials from southwestern Turkmenistan (cf. below pp. 00), but such links hardly prove the validity of a prehistoric Turan. On the contrary, granted the Sialk, Cheshmeh Ali, and Murteza Gert (Schmidt 1937: 323) ties, Hissar's connections with Turanian sites only demonstrate that it related with all its neighbours both within and outside this elusive interaction sphere. Miniature stone columns have been discovered at Damin (Tosi 1970: fig. 56) in the Bampur valley and possibly at Shahdad (Hakemi 1972: 28, numbers 158-159) on the western edge of the Lut in the Kerman province. Compartmented seals (*ibid.*: pl. XXXIB) and pottery (*ibid.*: pl. VIIB) reminiscent of south Turkmenian forms were also found at the latter site, which, admittedly, is noteworthy because it contains so many items from different cultural areas.

If we turn to the eastern boundaries of Turan, this same problem of arbitrary limits confronts us. Piggott (1947) long ago dubbed a distinctive ceramic assemblage from the Quetta valley in northern Pakistan 'Quetta ware' which Fairservis (1956) on the basis of various excavations and soundings then placed within the local archaeological sequence; Sarianidi (1965: 48-50) noted the striking similarities of this ware with pottery from the Geoksyur oasis in southern Turkmenia, and Tosi (1973: 437-444) utilized this same evidence to support his thesis of a southward migration from the Geoksyur oasis in early Namazga III times (late fourth millennium) to northern Baluchistan and Seistan. But in defining Turan, Tosi (1979: 159-161) explicitly excludes all Baluchistan in order to pose an opposition between the urban settlements of Turan with those of the Indus valley. Baluchistan, in other words, is relegated to a 'frontier' or 'interference' zone, a buffer area that first is dominated largely by Turan and then later by the Indus valley. One cannot help but wonder whether this interpretation is coloured by knowledge of the nineteenth century's 'great game' which pitted the Russian and British Empires against each other and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

resulted in creating the nation-state of Afghanistan, a country whose demarcated borders make little sense from either a geographic or ethnographic perspective. The logic for Turan seems equally strained and leads to equally problematic results. To dismiss all Baluchistan as a non-urban culture backwater is to ignore the existence of numerous, large, but barely excavated sites, such as Dabar Kot (Stein 1929). The same observation can be made for Bampur, a site included in Tosi's zone of cultural interference. Despite de Cardi's (1970) work at Bampur, the exposures are still limited relative to the total size of the site, and it is safe to predict that more extensive excavations will yield far greater evidence for contacts with sites to the west, such as Yahya, and Turanian settlements, such as Shahr-i Sokhta, to the north. Tosi's discussion of a shift from Turanian to Harappan-dominated influences throughout Baluchistan during the third millennium is valuable and important; it helps define the expanding power of the Indus Civilization. However, the existence of a Turanian interaction sphere is not essential to the argument; if one removes the label *Turan* and views these earlier influences as simply originating in southern Turkmenia, the Helmand valley, or even the Iranian plateau, one is left with a diffusionistic model that is not crucially different from that presented by Fairservis (1971: 222-228), a scholar whose views Tosi subjects to harsh criticism.

Similarly, recent discoveries in north-eastern Turan, possibly dating as early as the late fourth millennium, blur the area's remaining boundaries. Namazga III scatters have been discovered deep in the Kara Kum in what was the former delta of the Murghab river (Masimov 1979; personal communication), and the large important site of Sarazm tepe on the banks of the Zeravshan river midway between Samarkand and Pendjikent contains painted pottery and small finds which are inspired by or related to Namazga III-IV materials further west (Isaakov 1978: 558).[8] The extension of some cultural elements further east through the Murghab delta to the lower (Zaman Baba) and middle (Sarazm) Zeravshan, thus, may have occurred as early as the Namazga III period. During Namazga V times settlements, such as Sapalli Tepe (Askarov 1973, 1977), containing close parallels with southern Turkmenia suddenly appear on the Bactrian plains (cf. also Sarianidi 1977). A Namazga V-VI cemetery was also discovered recently at Mehrgarh, just south of the Bolan pass in northern Pakistan (Jarrige, personal communication). Should these new sites and regions be included in an expanded Turan, and, if so, at what time? There is no ready answer, a fact which underscores the protean character of prehistoric Turan.

Our problem ultimately is related to the great diversity of material remains that have been found throughout this huge area. If we prefer to lump these materials into a single unit and call it Turan, the area begins to grow like a mushroom. Hissar is more closely related to Sialk than to Shahr-i Sokhta; if we include central Iran, we can play our imperial game once more and advance on Giyan or Godin Tepe in the western Zagros; from there it is a short march towards Khuzestan. Bampur I-IV and Shahr-i Sokhta II-III share many cultural similarities. If we include Bampur, then why not the Umm an-Nar materials from the Gulf coast (cf. de Cardi's 1970: 266-268)? And so forth.

Southern Turkmenia and the Eastern Elburz

Perhaps even more than the Helmand valley, southern Turkmenia represents a sub-region of Turan that appears to exhibit considerable cultural and geographical uniformity. Separated from the Iranian plateau by the Kopet Dagh mountains, the region is characterized by numerous streams and rivers that flow from these mountains and disappear into the Kara Kum desert. Moreover, southern Turkmenia is the best explored sub-region, and the sequence established by Soviet scholars over the past thirty years permits an accurate relative dating of the materials. But if examined closely, even this sub-region breaks down into smaller units, some of which appear more closely related to Tosi's eastern Elburz sub-region. Soviet archaeologists, for example, have long distinguished three distinct zones—western, central, and eastern—within southern Turkmenia (Masson and Sarianidi 1972: 56).[9] The first consists of those settlements along the northern slopes of the Kopet Dagh which are situated between Kyzyl Arvat and Anau; the second includes the important type sites of Kara-depe and Namzga-depe and stretches from Anau in the west to Dushak in the east; and, finally, the third now must be extended to include both the former Tedjen and Murghab

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

deltas as well as the catchment area that supported the large and most extensively excavated Chalcolithic and Bronze Age settlement, Altyn-depe. These regional variants become pronounced early in the Chalcolithic period (Namazga II) and only begin to disappear late in the third millennium. Thus, for example, the early polychrome pottery characteristic for the early Kara-depe Namzaga II levels must be distinguished from the later Geoksyur polychrome, typical for the eastern zone. The painted pottery for the Namazga III levels from Kara-depe consists largely of zoomorphic and floral black-on-white designs; contemporary pottery from the Geoksyur oasis contains more geometric black-on-red designs. During Namazga IV times the differences between the eastern and central zones are less pronounced; painted pottery designs and shapes are similar in both zones, though Ulug-depe, a major settlement located midway between the eastern and central zones, has painted designs on both white as well as red vessels, continuing the earlier central tradition (Sarianidi 1976: 89).

Our knowledge of developments in the western zone recently has become much better documented due to the publication of the Ak-depe materials (Sarianidi 1976); preliminary soundings of the prehistoric levles at Goch-depe about 30 km east of Kyzyl Arvat, which unear-
143 thed a unique grey female figurine in association with Namazga IV pottery (Yusupov *et al*, 1976: 555-559; pl. 1); and the recent discovery and excavation of an Early Bronze Age cemetery in the Sumbar valley (Khlopin n.d.). The presence and dominance of grey wares are the most distinguishing features of the western remains. This ware is virtually absent at Altyn-depe and constitutes well under 10 per cent of the early assemblage from Kara-depe (Kircho, personal communication); at Ak-depe, a c.10 hectare site which is situated about 30 km west of Ashkha-
144 bad, grey ware (pls. 2-4) appears to be the
145 dominant ceramic form[10] and is found through-
146 out the sequence in association with classic
147 Namazga III-IV painted wares (pls. 5-7). The grey
148 carinated forms, particularly, are closely paralleled in the Parkhai II cemetery in the Sumbar valley (Khlopin n.d.) and at Tureng Tepe and Shah Tepe in the Gürgan plain; incised forms, possibly, also are related to Early Bronze ceramics from Yarim Tepe on the Karu Su near Gonbad-i Qabus, and the application of small snakes on the surfaces of vessels has parallels at Hissar (Schmidt 1937: pl. XL) as well as at the Gurgan plain sites.[11] In short, south-western Turkmenistan seems as closely, if not more, related to the Gurgan plain than to the central and eastern zones of its sub-region.

One must not equate the presence of certain wares with the presence of specific ethnic groups (cf Kramer 1977: 91), and it would be foolish to speculate on a hypothetical homeland, stretching from the Gurgan plain east to Ashkhabad, for an equally hypothetical Indo-Iranian speaking group soon to expand west on to the Iranian plateau during the second millennium B.C.[12] However, these cultural distinctions based upon cultural remains are supported by simple geographical considerations. West of Ashkhabad the Chandyr and Sumbar rivers are easily reached; these then join and flow west into the lower Atrek which comes down through the Misrian plain to the Caspian Sea. No important physical barriers separate the lower course of this river from the numerous settlements on the Gurgan plain (cf. Shiomi 1976 and 1978 for the most recent surveys of this area).

Moving east to the central zone, different geographical factors come into play. The Darreh Gaz plain, which is watered by the Dorunger river that flows out to the Artyk oasis, was easily accessible to the inhabitants of Namazga-depe, Kara-depe, Elen-depe, Shor-depe, and related central sites. Several passes across the Kopet Dagh (cf. Curzon 1892: 86-112; Napier 1876: 88-94, 158-159) connect this plain with Kuchan and the upper Atrek valley. However, west of Shirwan the valley narrows, clearly separating the upper and lower courses of the Atrek; the modern road climbs south and reaches Budjnurd from which it is possible to continue further south-west on to the Isfarayin plain and, finally, the Iranian plateau (Spooner 1965: 97-99). Recently, archaeological work along the upper Atrek (Biscione 1978; Kohl and Biscione n.d.) and on the Darreh Gaz plain (Kohl and Heskel n.d. a and b) has discovered Bronze Age remains with unmistakable affinities to materials from Kara-depe and Namazga-depe 147
(pl. VI); i.e., the Darreh Gaz plain and the middle Atrek valley relate most closely to the central Southern Turkmenian zone.

The eastern zone is distinguished by the two large deltas of the Murghab and Tedjen rivers; for this reason, presumably, this zone witnessed the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

densest build-up of settlements and population in Aeneolithic and Bronze Age times. The Tedjen and Murghab rivers also must have acted as conduits linking this zone with still undiscovered cultures located, respectively, to the south-west and south-east along their middle and upper courses. One can predict that when archaeological surveys are conducted along the Kashaf Rud west of Meshed or in the sub-delta oasis near Serakhs, prehistoric remains will be discovered that most closely resemble those from Altyndepe, the Geoksyur area, and the former Murghab delta.

Southern Turkmenia, thus, is characterized by regional diversity. Though each zone can be linked to the other and tied, in turn, to sites as far west as Hissar on the Iranian plateau, such evidence cannot be used directly to construct a prehistoric Turan. As already observed, Turan can be extended almost indefinitely in any direction—if the only rules of the game are the establishment of material links between contiguous areas. Rather, our cursory review of the distinctions within southern Turkmenia (and, by extension, Iranian Khorassan) serves a different purpose; it demonstrates that Turan was distinguished by its regional cultural diversity. The two type sites, Shahr-i Sokhta and Mundigak, of the Helmand valley 'civilization' share far fewer and less significant parallels in material remains than those which unite the two major sites (formerly, 'twin capitals') of the Indus Valley Civilization, Mohenjo-daro and Harappa. This observation is critical and illustrates the real value of Tosi's definition of an outer Iran. What is more impressive about Turan is how much is *not* shared in common. Cultural diversity, partially shaped and continually reinforced by geographical factors, distinguishes an outer from an inner Iran (at least, along the southern Zagros) or from the Gulf coast. Communications were never easy throughout this vast area; local differences developed quickly and were retained despite the possibility of occasional movements of people from south-eastern Turkmenistan to Seistan and the Quetta valley or, later, onto the Bactrian plains. While certain problems, such as the inclusion of Bampur or exclusion of Hissar, remain with Tosi's definition, it is still important to distinguish the cultures east and north of the great Iranian deserts from those further west. As such, Turan is a useful rubric for a vast area that is noteworthy for its heterogeneity. It is, however, misleading to emphasize those few features, like the miniature stone columns or compartmented seals, which it shares in common, and refer to it exclusively as an interaction sphere or zone of cultural integration.

The opposite pattern is dominant and allows us to conclude with an observation on the relevance of prehistoric Turan for the emergence of the Indus Civilization. Large urban sites appear in Turan prior to their development on the Indus plains. Such features as monumental architecture and full-time craft specialization strongly suggest the existence of complex class-stratified societies in outer Iran prior—on present evidence—to their unmistakable occurrence during Harappan times. Later evidence during the Harappan period for extensive contact between Central and South Asia most likely implies the existence of earlier exchanges of materials and ideas that must have influenced developments in both areas. The Indus Valley Civilization did not emerge in a vacuum, and one must resist the current trend to view all developmental processes as essentially autochthonous. Yet, if we return to our observation that the most striking feature of Turan is its cultural heterogeneity, then a sharper contrast cannot be drawn with the Indus Civilization. The uniformity of the Indus Valley Civilization has been commented on for years by various scholars.[13] Sankalia (1974) correctly insists that these uniformities have been exaggerated: some sites, such as Kot Diji, Surkotada, and Lothal, consist only of a single mound and others, such as the settlements along the Makran coast, regularly employ stone architecture and not the more typical fired bricks of standardized proportions. Other differences exist, but the relative uniformity of Harappan material culture cannot be denied (cf. also Sankalia 1977: 91-93). This civilization, which formed on plains watered by a single river and its tributaries (only later extending far beyond them), achieved a degree of cultural integration far surpassing that of its western neighbours. Turan clearly provided no model of development. The uniformity of Harappan material remains, possibly reflecting a social and political union, must be explained on its own terms.

[This article was written prior to the appearance of a longer and more definitive statement of Turan (Biscione and Tosi). I have been unable to

 CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

examine this work in detail, though a cursory perusal suggests that it simply elaborates the previous conception of Turan. The criticisms raised in this article remain valid.]

ACKNOWLEDGEMENT

Numerous Soviet archaeologists let me examine their materials and helped me form the views expressed in this article. The interpretations, of course, are my sole responsibility. I specially want to thank Drs. A.A. Askarov, L. Kircho, I. Masimov, V.M. Masson, V.I. Sarianidi, Kh. Yusupov, I.N. Khlopin, and L.I. Khlopina.

NOTES

1. It need not be emphasized that the existence of cities and the presence of states are not identical phenomena. Tosi's acceptance of Johnson's definition allows him to demonstrate the importance of *regional* or *local* exchange within Turan (1977: 64) but also takes him further than he is apparently willing to be led concerning any larger political entities within this region. That is, he denies any social political hegemony uniting the area and, undoubtedly, would baulk at a discussion of a Turanian Civilization. Civilizations also are not synonymous with states (Gupta 1979 II: 121), but since a major purpose of Tosi's definition is to show Turan's relevance for the emergence of the Indus Civilization, it would seem appropriate, at least, to raise the question why the level of cultural integration known as 'civilization' was never achieved in prehistoric Turan.
2. One obvious difficulty with this separation must be noted: the presence of a proto-Elamite tablet (cf. Basaglia *et al* 1978: 259-261, pl. 34) in the earliest levels at Shahr-i Sokhta. While southern Turkmenian influences in these same levels are more numerous and appear dominant. (Biscione 1973), one clearly has evidence for some degree of contact across the Dasht-i Lut into Seistan during Shahr-i Sokhta's formative period, a time which witnessed the maximum expansion of the proto-Elamite system of writing in the Zagros (Lamberg-Karlovsky 1978).
3. The same dominance of western, as opposed to eastern, contacts prevailed at Tepe Yahya during the earlier IVC period—as is witnessed by diagnostic ceramics, seals and sealing impressions, and the proto-Elamite tablets (Lamberg-Karlovsky 1978).
4. Tosi (1974a) has also noted a striking similarity in the chipped stone tools of Shahr-i Sokhta with those found much further north in the Kyzyl Kum near the Lyavlyakan lakes (Vinogradov and Mamedov 1975: 231-233); Vinogradov's independent dating of the stations with micro-drills that processed turquoise correlates well with that of Tosi for the periods at Shahr-i Sokhta containing the most turquoise and supports his interpretation of contact, possibly involving the exchange of raw materials, between Seistan and the Kyzyl Kum in the mid-third millennium.
5. Certainly their discovery in room 7 of the temple complex (excavation 5) at Altyndepe suggests some type of cult of bioarchaeological and ecofactual data (Basaglia *et al*) function or, at least, something not directly utilitarian (Masson 1974: 8, illus. 4 and 5). Dales (1977: 25) agrees with this interpretation and believes that the objects were still used in a similar fashion in the nineteenth century.
6. Indeed, one of the great strengths of the entire Italian programme at Shahr-i Sokhta has been its retrieval (1978: *passim*). No stone has been left unturned that sheds light upon the environmental setting of this important Bronze Age culture. The programme at Shahr-i Sokhta seeks to construct the entire range of productive activities at the site—an admirable, if ambitious, goal.
7. The Hissar-Sialk similarities were discussed in detail by McCown (1942: 1-13, 50-59) and later elaborated by Dyson (1965: 239-242). Tosi himself (1974b) has written the most complete statement on the strong similarities in material remains of the Bampur valley with those from Iranian Seistan.
8. Materials from this recently discovered and still unpublished site are not unambiguous. I was fortunate to visit the site with Dr. A.A. Askarov, Director of the Institute of Archaeology, Academy of Sciences in Samarkand, in May 1979. Dr. Askarov prefers to date the site later to the second millennium and sees

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

northern ('steppe' and Kelteminar), western (Zaman Baba), and southern (Sapalli), as well as southern Turkmenian parallels in the materials. In his view it combines these elements to form a new and distinct culture. The excavator, A. Isaakov, and, apparently, V.M. Masson, who has seen the material, agree with this overall interpretation but prefer to date the site earlier to Namazga III-IV times. Though my experience with this material is much more limited, definite painted, as well as non-painted (e.g., red burnished wares with dark spots characteristic of the Namazga IV and earlier levels at Altyn-depe), ceramic parallels and the discovery of a padlock-shaped or handled stone weight analogous to finds further west (e.g., Dales 1977: 20) lead me to accept the latter interpretation. A large settled agricultural community seems to have existed along the middle Zeravshan during the third millennium or several hundred years prior to the settling of the north Bactrian plains.

9. Arguing strictly from a geographical perspective, it makes more sense to divide the areas encompassing Namazga-related materials into upland, piedmont, and lowland zones. The first would include those still scantily documented mountain valleys, such as the Sumbar, Atrek, Kashaf Rud, and Hari Rud, which are located to the south, chiefly in Iran and Afghanistan. The second zone would contain the settlements in the upland plain of Darreh Gaz and the site in southern Turkmenistan, such as Kara-depe, Namazga-depe, and Altyn-depe, which utilized the runoff from the Kopet Dagh. The lowland zone would be comprised of those sites situated within the former deltas of the two major rivers in Turkmenistan, the 'little Central Asian Mesopotamia' that is formed by the Murghab and Tedjen rivers. This region, also ill-explored, occupied a much more extensive area in the early Holocene than it does today (cf. Tosi and Kohl forthcoming); current investigations are proving that this lowland zone contained numerous, hitherto unsuspected Bronze Age sites (e.g., Masimov 1979).
10. Ak-depe was excavated in the 1930's by Maruschenko. To my knowledge, the exact percentages of the different wares have not been published. My estimates is based on the material I saw and photographed in Leningrad and Ashkhabad. It is also relevant to note that grey wares constitute c. 30 per cent of the ceramics from the uppermost levels at Namazga-depe (Khlopina, personal communication). These, however, can be readily distinguished by form and fabric from the earlier materials.
11. I am indebted to Michael Ingraham for this observation.
12. Young's (1967) provocative thesis about an east to west migration recently has been cogently criticized by Medvedskaya (1977, 1978).
13. Contrast, for example, the disparaging comments of Piggott (1950: 141) with the more sanguine interpretation of Rao (1973: 5).

REFERENCES

Askarov, A.A. 1973. *Sapalli tepa*, Tashkent.

———. 1977. *Drevnizemledelcheskaya kul'tura epokhi bronzi uga Uzbekistana*. Tashkent.

Basaglia *et al* 1978. *La Citta' Bruciata del Deserto Salato*, Erizzo. Venezia.

Biscione, R. 1973. Dynamics of an Early South Asian Urbanization: The First Period of Shahr-i Sokhta and Its Connections with Southern Turkmenia. In *South Asian Archaeology*; N. Hammond, ed. Duckworth; 105-118.

———. 1978. The Problem of Pre- and Proto-historic Connections between Central Asia and the Iranian Plateau as Seen from the Atrek Valley. *Proceedings of the VI Annual Symposium on Archaeological Research in Iran*. Teheran (forthcoming).

Biscione, *et al* 1974. Archaeological Discoveries and Methodological Problems in the Excavations of Shahr-i Sokhta, Sistan. In *South Asian Archaeology 1973*; Van Lohuizen-De Leeuw and Ubaghs, ed. Leiden: 12-52.

Biscione, R. and Tosi, M. 1979. *Protoistorial Degli Stati Turanici*. Supplemento 20. *Annali*; Vol. 39; fasc. 3.

Bulgarelli, G.M. 1974. Tepe Hissar. Preliminary Report on a Surface Survey, August 1972. *East and West*. Vol. 24, 1-2; 15-27.

Curzon, G.N. 1892. *Persia and the Persian Question*. Vol. I. London.

Dales, G. 1977. Hissar IIIC Stone Objects in Afghan Sistan. In *Mountains and Lowlands: Essays in the Archaeology of Greater Mesopotamia*. Levine and Young, ed. 17-28. Undena.

de Cardi, B. 1970. *Excavations at Bampur, A Third Millennium Settlement in Persian Baluchistan, 1966*. Vol. 51, part 3. Anthropological Papers of the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

American Museum of Natural History. New York.

Dyson, R.H. 1965. Problems in the Relative Chronology of Iran, 6000-2000 B.C. In *Chronologies in Old World Archaeology;* R.W. Ehrich ed. Chicago; 215-256.

Fairservis, W.A. 1956. *Excavations in the Quetta Valley, West Pakistan.* Vol. 45; part 2. Anthropological Papers of the American Museum of Natural History. New York.

———. 1971. *The Roots of Ancient India.* New York: Macmillan.

Francfort, H.-P. and Pottier, M.-H. 1978. Sondage preliminaire sur l'etablissement protohistorique harappeen et post-harappeen de Shortugai (Afghanistan du N.E.). *Arts Asiatiques.* 34; 29-79.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia, and the Indian Borderlands.* Vol. II. New Delhi.

Hakemi, A. 1972. Catalogue de l'exposition: LUT Xabis (Shahdad). Teheran.

Isaakov, A.I. and Eshonkulov, U. 1978. Raboti kosataroshkovo otryadda. *Arkheologicheskiye Otkritiya 1977 goda.* Moscow; 557-558.

Jarriage, J.-F. and Lechevallier, M. 1979. Excavations at Mehrgarh, Baluchistan: Their significance in the Prehistorical Context of the Indo-Pakistan Borderlands. In *South Asian Archaeology 1977.* Vol. 1; M. Taddei ed.; 463-536.

Johnson, G. 1973. *Local Exchange and Early State Development in South Western Iran.* Anthropological Paper no. 51: Ann Arbor: Museum of Anthropology. University of Michigan.

Kholpin, I.N. n.d. Mogilnik epokhi ranney bronzi Parkhai II. Pervii dva sezona raskopok v 1977-1978 gg. To appear in *Recent Bronze Age Discoveries in Central Asia;* P. Kohl ed. (1981).

Kohl, P.L. 1978. the Balance of Trade in southwestern Asia in the Mid-Third Millennium B.C. *Current Anthropology.* Vol. 19, 3; 463-492.

——— 1979. The 'World Economy' of West Asia in the Third Millennium B.C. In *South Asian Archaeology 1977.* Vol. 1; M. Taddei. Naples ed.; 55-86.

———. A Note on Chlorite Artefacts from Shahr-i Sokhta. *East and West* (forthcoming).

Kohl, P.L. and R. Biscione n.d. Prehistoric Investigations in Iranian Khorassan. To appear in *Recent Bronze Age Discoveries in Central Asia.* (1981).

Kohl, P.L. and D. Heskel n.d. Archaeological Reconnaissances in the Darreh Gaz Plain: A Short Report. *Iran.* (forthcoming).

———. n.d.b. An archaeological Survey in the Darreh Gaz Plain and the Extrusion of the Namazga Sequence into Iranian Khorassan *Sovyetskaya Arkhelogiya.* (forthcoming).

Kramer, C. 1977b. Pots and Peoples. In *Mountains and Lowlands: Essays in the Archaeology of Greater Mesopotamia.* Levine and Young ed. *Bibliotheca Mesopotamica.* Vol. 7; Undena; 91-112.

Lamberg-Karlovsky, C.C. 1978. The Proto-Elamites on the Iranian Plateau. *Antiquity.* Vol. 52, 205; 114-120.

Lyonnet, B. 1977. Decouverte de sites de l'age du bronze dans l'Afghanistan du N.E. *Annali.* 19-35.

Mackay, E. 1935. *The Indus Civilization.* London.

Masimov, I. 1979. Izoocheniya pamyatnikov epokhi bronzi nizov'ev Murgaba. *Sovyetskaya Arkheologiya.* No. 1; 11-131,

Masson, V.M. 1967. Protogorodskaya civilizatisiya uga sredney Azii. *Sovyetskaya Arkheologiya.* No. 2; 165-190.

———. 1974. Raskopki pogrebal'novo kompleksa na Altyn-depe. *Sovyetskaya Arkheologiya.* No. 4; 3-22.

Masson, V.M. and Kiyatkina, T.P. 1976. Chelovek na zare urbanizatsii. *Priroda.* No. 4; 32-47.

Masson, V.M. and Sarianidi, V.I. 1972. *Central Asia: Turkmenia Before the Achaemenids.* London.

McCown, D.E. 1942. *The Comparative Stratigraphy of Early Iran.* Chicago.

Medvedskaya, I.N. 1977. Ob 'Iranskoy' prinadlezhnocti seroy keramiki pannezheleznovo veka Irana. *Vestnik Drevney Istorii.* No. 2. 93-105.

———. Iran posledney chetverti II tis. do n.e. po arkheologicheskim materialam. K. ranney isotorii Iranskix plemen. Avtoreferat, kand. dissertation. Leningrad.

Mughal, M.R. 1970. *The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan.* Ann Arbor: University Microfilms.

Napier, G.C. 1876. Extracts from a Diary of a Tour in Khorassan, and Notes on the Eastern Alburz Tract. *Journal of the Royal Geographical Society.* Vol. 46; 62-171.

Piggott, S. 1947. A New Prehistoric Ceramic from Baluchistan. *Ancient India.* No. 3; 131-42.

Piperno, M. 1973. Micro-drilling at Shahr-i Sokhta: The Making and Use of the Lithic Drill-heads. *South Asian Archaeology.* N. Hammond ed.; 119-129.

Rao, S.R. 1973. *Lothal and the Indus Civilization.* Bombay.

Sankalia, H.D. 1974. *Prehistory and Protohistory of India and Pakistan.* Poona.

———. 1977. *Prehistory of India.* New Delhi.

Sarianidi, V.I. 1965. *Pamyatniki pozdnevo aeneolita uga-vostochnoy Turkmenii.* Moscow.

———. 1976. Yuzhnii Turkmenistan v epoky bronzi. In *Pervobwitni Turkmenistan.* Ashkhabad; 82-111.

———. 1977. *Drevniya zemledel'tsiye Afganistana.* Moscow.

Schetenko, A. Ya. 1970. O torgovix pytyax epokhi bronzi po materialam Turkmenistano-Harappskix paralleley. *Kratkiya Soobshcheniye.* 122; 59-63.

———. 1974. Obmen i torgovlya doistoricheskovo Indostana. Kratkiye Soobshcheniye. 138; 38-43.

Schmidt, E.F. 1937. *Excavations at Tepe Hissar*

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Damghan. Philadelphia.

Shiomi, H. 1976. *Archaeological Map of the Gorgan Plain, Iran, No. 1*. Hiroshima: Hiroshima University Scientific Expedition to Iran.

———. 1978. *Archaeological Map of the Gorgan Plain, Iran, No. 2*. Hiroshima: Hiroshima University Scientific Expedition to Iran.

Spooner, B. 1965. Arghiyan: The Area of Jajarm in Western Khurasan. *Iran*. No. 3; 97-107.

Stein, A. 1929. *An Archaeological Tour in Waziristan and Northern Baluchistan*. Memoirs of the Archaeological Survey of India. No. 37; New Delhi.

Terekhova, N.N. 1975. Metalloobrabativayushcheye proizvodstvo u drevneishix zemledel'tsev Turkmenii. In *Ocherki technologii drevneishix proizvodstv*. Moscow.

Tosi, M. 1970. A Tomb from Damin and the Problem of the Bampur Sequence in the Third Millennium B.C. *East and West*. Vol. 20, 1-2; 9-50.

———. 1973. Early Urban Evolution and Settlement Patterns in the Indo-Iranian Borderland. In *The Explanation of Culture Change: Models in Prehistory*. Renfrew ed. Pittsburgh; 429-446.

———. 1974a. The Problem of Turquoise in Protohistoric Trade on the Iranian Plateau. *Studi Paletnologia, Paleoantropologia, Paleontologia e Geologia del Quaternario*. 2; 147-162.

———. 1974b. Bampur: A Problem of Isolation. *East and West*. Vol. 24, 1-2; 29-49.

———. 1977. The Archaeological Evidence for Protostate Structures in Eastern Iran and Central Asia at the End of the 3rd Millennium B.C. In *Le Plateau Iranien et L'Asie Centrale des Origines a la Conquete Islamique*. Deshayes ed. CNRS; Paris.

———. 1979. the Proto-urban cultures of Eastern Iran and the Indus Civilization. Notes and Suggestions for a Spatio-temporal Frame to Study the Early Relations between India and Iran. In *South Asian Archaeology 1977*. M. Taddei ed. Naples; 149-171.

———. n.d. The Development of Urban Societies in Turan and the Mesopotamian Trade with the East: The Evidence from Shahr-i Sokhta, manuscript read at the XXVth Rencontre Assyriologique, Berlin, July 1978.

Tosi, M. and Kohl, P.L. (forthcoming). The Lands of Prehistoric Turkmenia. In preparation for *Annali*.

Vinogradov, A.V. and E.D. Mamedov 1975. *Pervobwitni Lyavlyakan*. Moscow.

Wheeler, Sir Mortimer 1968. *The Indus Civilization*. Cambridge: Cambridge University Press; third ed.

Young, T.C. 1967. The Iranian Migration into the Zagros. *Iran*. No. 5; 11-34.

Yusupov, Kh. and A. Gubaev, M. Durdiyev 1976. Vtoroi sezon rabot na Goch-depe. *Arkheologicheskiye Otkritiya 1975 Goda*. Moscow.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

37

Denis L. Heskel

Iran-Indus Valley Connections: A Revaluation

It is fitting that more than sixty years after John Marshall's excavations at Mohenjo-daro (1921) the evidence of connections and relationships between the civilizations of the Indus Valley and contemporary Iran be reviewed.

John Marshall attempted to connect the materials found at Mohenjo-daro to those found at sites in Baluchistan and Iran primarily to aid in the establishment of a chronology for the Indus Valley Civilization (1931: 59; 99-100; 104-105). Almost all connections were based on a limited number of stylistic comparisons. One of the major problems affecting Marshall's correlations was the paucity of excavated sites in Iran and Baluchistan. In 1931, when the Mohenjo-daro report appeared, excavations of contemporary material in Iran was limited to Susa and the Susianna material (*Memoires de la Mission archeologique de Perse*) and perhaps the preliminary excavations at Tepe Hissar (Schmidt 1931).

The archaeological evidence from Baluchistan was greater, but still insufficient for the establishment of completely satisfactory correlations. The Nal cemetery, excavated by Hargreaves (1929) provided the bulk of excavated material related to the Mohenjo-daro remains (Marshall 1931: 99-100). The work and reports of Aurel Stein (1929; 1931) also provided some evidence, particularly from Mughal Ghundai and Periano Ghundai, which was felt by Marshall (1931: 59) to demonstrate the relationship of Baluchistan as the transmitter of Mesopotamian Civilization to Mohenjo-daro.

The relationship between the Indus Valley and Iran also occupied the thoughts of Mortimer Wheeler, as evidenced by his article on this subject about twenty-five years after Marshall's excavations at Mohenjo-daro (Wheeler 1948: 85-101). Wheeler summarized the newly available evidence from sites that had been excavated in the 1930's and '40's. The Iranian sites included: Tepe Hissar (Schmidt 1937), Tepe Sialk (Ghirshman 1938), Tepe Giyan (Contenau and Ghirshman 1935), Tall-i-Bakun (Schmidt 1939: 121-129; Langsdorff and McCown 1942), Shah Tepe (Arne 1935: 1-151; 1945), and the continued excavations at susa and Susianna sequence (*Memoires de la Mission archeologique de Perse*, particularly Volumes 25 and 29). Wheeler also utilized some of the other synthetic articles on this problem, notably those by McCown (1942 a and b; 1946) and Piggott (1943; 1946).

At this time, of course, there were major excavations within the Indus Valley, most notably those of Mackay (1938; 1943), Vats (1940), Wheeler (1947), as well as several extensive and valuable surveys, including Majumdar's (1934) and Stein's (1937).

One of the most noteworthy papers of this time was that by McCown and Ross (1946) on the excavation of Rana Ghundai which included a discussion by McCown on chronological and diffusionistic considerations. In this article, McCown postulated the movement of the 'Buff Ware pottery people' from Iran into Baluchistan and the possible importance of this in the development of the Harappan Culture (McCown and Ross 1946:

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

286). This concept will be discussed in more detail later but it is important to remember that Wheeler extended this argument, including work by Gordon (1947) and Piggott (1946), to provide two separate geographical and cultural groups, 'a northern and a southern, a Red and a Yellow' (Wheeler 1948: 88). These migrational and diffusionist arguments, based totally on ware-colour, are too simplistic to be accorded much validity today. It is also worth briefly noting here that many of the correlations were based on faulty stratigraphic and chronological contexts.

All of these comparisons were done, however, on stylistic similarities of limited well-documented material. It was necessary to attempt to evaluate all of the 'new' evidence from the major excavations of the 1930's and 40's in the Indo-Iranian area, but important gaps remained. The division of the ceramic ware was too simplistic to provide any useful or accurate picture of the complex interactions involved. The importance of McCown's article lies more in its attempt to explain, by a diffusionistic model, the transmission of the idea or germ of civilization.

Since Wheeler's article there have been many new excavations in the Indo-Iranian area as well as new and important synthetic works. These will be discussed later but only in terms of the connection between Iran and the Indus Valley.

It will be necessary first to summarize quickly some of the important geographical and chronological considerations involved in this problem.

The Geography

The geography of the Iran-Indus Valley area can best be seen as a series of physical obstacles that limit extensive contact over long distances to a few difficult routes. This impression is mainly derived from the established trade routes used during the Islamic period **(fig. 37.1)**.

Susa and the other Susianna sites are located in the flat Khuzistan plain, which is a geographical extension of Mesopotamia (Ghirshman 1954: 24). Directly to the east are the western mountains of the Zagros range which run north-west to south-east and consist of numerous folds and valleys set between mountains that rise to 1670 metres above sea-level. The northern area of Iran is marked by the Elburz mountain chain which forms a natural barrier to the Caspian Sea (Ghirshman 1954: 22). This area is densely forested and receives heavy and regular rainfall (Khan 1964: 3). The Elburz and Khurasan mountains are a continuation of the Hindu Kush chain (Khan 1964: 3).

In the south, the Makran chain provides a geographical barrier except for two passes: one to Bander Abbas, and the other to Baluchistan and Quetta (Ghirshman 1954: 23). The centre of the Iranian plateau mainly consists of two desolate salt deserts, the Dast-i Kavir and the Dast-i Lut. They form an effective barrier east and west and divert trade either to the northern edge of the Dast-i Kavir, towards China, or over the mountains to the Indus Valley, or to the southern edge of the Dast-i Lut (Frye 1963: 7). The great Himalayan mountain range gives the Indus Valley region the appearance of geographical isolation. There are, however, several major east-west entry points into the Indus region.

Wheeler (1948: 86) divides the trade routes into two groups: southern and northern. The northern group converges on the Khyber Pass, allowing contact with northern Iran, the Oxus region and the central Indus area. The southern group of routes links central and southern Iran either with Kandahar and northern Baluchistan and the southern Indus area or along the Makran coast and the Indus delta (Wheeler 1948: 86).

There is no navigable river that reaches the sea from the Susianna plain (Khan 1964: 5). This is an important geographical fact which, when coupled with the mountain barriers to the sea, necessitated land routes from western Iran to Baluchistan and to the Indus Valley.

The areas of Baluchistan and Makran, which separate Iran from the Indus Valley, 'are today forbidding barren mountains, amid desert and sandy waste' (Piggott 1950: 66). The Pakistani Makran coast extends for 300 miles of:

> uninviting sandhills, mangrove swamps, . . .Inland consists of a massif of irregular mountain ridges up to 7,000 feet in height. The valleys tend to be isolated from each other. East-west passage is only possible through passes in the ranges or following eastward running rivers such as the Mula and Gaj. (Piggott 1950: 66).

The desert reaching from upper Sind to Seistan and the Helmund oasis, the location of Shahr-i Sokhta, is less than a hundred miles (160 km approx.), but covers a 3000 foot (914 m) high plateau with peaks that rise to over 10,000 feet (3048 m approx.) at Koh-i-Maran (Piggott 1950-67). The central Brahui range seems to have formed an effective barrier to the widespread ex-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

pansion of the Indus Valley Civilization except along certain routes. Thus, it appears that geographical considerations play a substantial part in a discussion of Indus Valley-Iran contact.

It will also become apparent that much of the recent archaeological work in the Indo-Iranian area has concentrated on, and elucidated the importance of, these southern and northern east-west access routes of the question of Indus Valley-Iran connections.

The northern boundary of the Harappan culture extends not only to Ropar but up to the Gomal Valley (Dani 1971; Mughal 1973: 3). These reported Indus Valley sites follow the direction of the Ghazni-Kandahar uplands. The identification of Sutkagen-dor (Stein 1927; Dales 1962), Sotka-Koh (Dales 1962), and Bala Kot (Raikes 1963: 657; Dales 1974) shows the existence of Indus Valley sites along the Pakistani Makran and 'it is legitimate to expect that others await identification across the border in Persian Makran' (Wheeler 1968: 61).

The Indus Valley Civilization is essentially confined to the vast riverine plain of the Indus and Ghaggar-Hakra river systems (Mughal 1973: 4). It does not seem to have penetrated westwards beyond the hilly borders of the Baluchistan hills. Indus Valley Civilization sites extend over a very large area, roughly from the Himalayas to the Makran coast and to Kutch and Saurashtra areas, north-south, and from the foothills of Baluchistan and Persian Makran to the Ganga Yamuna Doab (Wheeler 1968: 24 ff; Mughal 1973: 4). Mughal (1973: 6) raises the crucially important point, however, that 'we have yet to determine how many Harappan settlements were contemporary with each other at one specific time.' This statement raises important chronological questions both within the development of the Harappan culture and between the Indus Valley and Iran.

Artefactual Evidence

Attempts have been made to establish firm artefactual and conceptual connections between the Indus Valley and Iran and the Indus Valley and Mesopotamia chiefly to determine a relative and/or absolute chronology for the Indus Valley Civilization.

Marshall's (1931: 105) explanation of the relationship of the Indus Valley, Baluchistan, and Persia was that they

> were closely related and mutually influenced by one another during the first Preduluvian Period and that this influence was kept alive in the more eastern countries after it has eclipsed in Persia itself.

The actual connections of motifs and objects established by Marshall tend to centre on isolated and not particularly convincing evidence. He states (1931: 105, Pls. XCI-XCII) that a peculiar comb motif is found on Indus pottery and also Susa I pottery but:

> according to Mr. Mackay, does not occur in the Musyan, Susa II or Jemdet Nasr pottery and, in as much as it is altogether too distinctive and unusual a device to have originated independently in different localities, we must suppose, provisionally at any rate, that it was borrowed by the Indus pottery from those of Persia.

This type of evidence and argument was also used to connect Iran, mainly Susa, with the Indus Valley and thus establish a chronology. Some examples of Marshall's evidence include a 'step' pattern characteristic of Susa I pottery and the shell inlay work of the Indus Valley (1931: 105); the type of blade-axes found at Mohenjo-daro and paralleled at Susa (1931: 105); and that the resource area for turquoise found at Mohenjo-daro was thought to be in Persia (1963: 677-678). Marshall then estimated the antiquity of Mohenjo-daro at 3250-2750 B.C. on the basis of these connections. These correlations can no longer be accepted because of an overwhelming amount of stratigraphic and chronological data that dismiss them.

Marshall did not establish a detailed explanation for the transmission of cultural material between Iran and the Indus Valley. But he did concentrate on the poorness, in terms of environment and material culture, of Baluchistan, particularly Nal, and felt that Baluchistan would be 'largely dependent for its culture on the richer and populous regions that adjoined it' (Marshall 1931: 96). The Nal polychrome ware is linked to Persia, particularly to Susa I pottery (Marshall 1931: 99 ff.). The presence of partial, fractional and complete burials at Nal and Shahi-Tump is also seen by Marshall as representing Persian and not Indus Valley influence. It is implied, though not directly, that the transmission of styles and objects was accomplished either by traders or by a small migration from Iran to Baluchistan and eventually to the Indus Valley. At one place Marshall (1931: 104) states that in respect of the:

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

bone cylinder seal of the 'bull and manger' type, which was found in association with some Proto-Elamite tablets in a deposit of Susa II Period . . . about the time of Sargon of Agade, it is noteworthy that the design and technique are unusually crude as compared with the ordinary type of Indus seal . . . From its style and cylindrical form, however, which is Mesopotamian or proto-Elamite and not Indian, it seems more likely that this seal was engraved possibly for an Indian settler by a local Elamite craftsman.

This is as explicit as Marshall ever is about the nature of the contact.

Until the introduction of radiocarbon dating into archaeology, most of the connections between the Indus Valley and Iran were concerned with the establishment of a relative chronology as well as an explanation of the development of the Indus Valley Civilization in terms of diffusion and migration of people. Much of the rationale behind these attempts derives from Childe's argument that all developments of civilization spread outward from the fertile crescent.

One of the most ambiguous but important synthetic works until the 1950's was McCown's (1942 a, b; 1946) establishment of a comparative chronological stratigraphy for Iran tied into the Mesopotamian chronology. This theory postulated two main cultural groups, the Buff-ware culture and the Red-ware culture, and theorized that these cultures extended from Iran into Baluchistan. McCown felt that Baluchistan was the important area to consider in the elucidation of the Indus Valley-Iran-Mesopotamia connections (1946: 284 ff). McCown's mechanism for the diffusion of civilization was the displacement of the Buff Ware culture in Iran and its drifting eastward 'to fill up the area of the Indus River' (1946: 286). The divergences between the Indus Valley Civilization and its supposed Iranian counterpart were explained away by the lack of present evidence on the mechanics of change (1946: 286).

Although this method of explanation was prevalent and acceptable at its time of inception, it is viewed as too simplistic among current archaeologists for its failure to recognize the complex nature of societies and their interactions that go beyond ceramic typologies.

McCown's arguments, however, resulted in the establishment of a basic absolute chronology for the Harappan culture, partially based on the time-lag necessary for the transmission of civilization from Mesopotamia to Iran and thence to the Indus Valley. This time-lag concept is extremely interesting and important in light of recent excavations and radiocarbon dates in the Indo-Iranian area. The use of time-lag concept did seem to imply and strengthen the diffusion of population explanation; it also channelled possible alternative explanations in a very narrow field, as evidenced by Piggott's statement (1946: 9):

it is essential to remember the peripheral position of Western India with regard to the more ancient settlements of Iraq and Iran from which its cultures are derived, and to realize that correlations with these cultures to the west may only show the earliest data at which a given feature could have appeared in India. The time-lag may be considerable before a specific Iranian or Sumerian pottery-style was manifested in Baluchistan or on the Indus, and we must constantly bear in mind the 'zoning' of cultures beyond primary centres.

Basically, the various stylistic, stratigraphic, and chronological considerations placed the Indus Valley Civilization as flourishing at 2300 B.C. (Wheeler 1947: 78 ff; 1948: 87; Piggott 1943: 178 ff; 1946: 25; McCown and Ross 1946: 290). The duration of the Indus Valley Civilization was generally considered to be 2500-1500 B.C., as was first set by Wheeler.

Wheeler (1947: 78-79) determined the terminal date of the Indus Valley Civilization based on a single seal from Ur published by Gadd (1932; Piggott 1943: 178; Lamberg-Karlovsky 1972: 222 ff). This seal is not actually an Indus Valley seal as was originally supposed but, rather, a Persian Gulf seal (Lamberg-Karlovsky, personal communication). This in effect disclaims the traditional terminal date of the Indus Valley Civilization.

The development of radiocarbon dating in 1949, by Libby, provided an important tool for prehistoric archaeology. The site of Kot Diji, excavated by Khan, was the first South Asian site to be dated by radiocarbon in 1956 at the University of Pennsylvania (Khan 1964: X; Mughal 1973: 22). Since then there have been numerous dates from diverse sites throughout the Indo-Iranian area. These dates have caused considerable re-evaluation of the chronological scheme of the area. It is apparent that Mesopotamia was not the sole innovative region in Asia and that all ideas and developments did not arise in the Tigris-Euphrates basin. Recent studies and radiocarbon dates, in fact, show that Iranian development in most aspects is contemporaneous with those in Mesopotamia (Lamberg-Karlovsky and Tosi 1973) and that Soviet Turk-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

menistan is an important and contemporary force in the Indo-Iranian area (Lamberg-Karlovsky 1973; Dales 1973).

There have also been several recent and excellent studies of the complex chronological problems of the Indus Valley Civilization, the Indo-Iranian borderland region, the pre-Harappan-Harappan transition, and developments on the Iranian plateau (Agrawal 1964, 1966; Dales 1965, 1968, 1971, 1973; Dyson 1965, 1968; Mughal 1970, 1973; Meadow 1973; Lamberg-Karlovsky 1974; Lamberg-Karlovsky and Tosi 1973; Wheeler 1968; to mention some of the most notable and most generalized overview studies). These studies have shifted to the establishment of a chronological framework utilizing not only radio-carbon dates but complex archaeological assemblages in conjuction with them rather than single motifs or objects, or radio-carbon dates alone. This important shift has also led to new and more subtle interpretations of the evidence of contact between the Iran-India area. These concepts will be discussed more fully later.

The details of the internal and external area chronologies are too complex to be included in this paper but a generalized chronological period equation from Mesopotamia to the Indus Valley is provided in order to aid in the evaluation of the interaction between Iran and the Indus Valley. It is extremely important to consider the general chronology in order to evaluate the strength of the evidence of interaction and the theoretical considerations of this interaction.

It is also important to remember that, based on Mughal (1970), the Early Harappan period, dated at 3000 B.C., which is located in the northern 'greater Indus Valley and northern Baluchistan' culminated in the Mature Harappan sites: This chronological aspect will bear careful consideration in dealing with the theories associated with the diffusion of the concept of urbanization to the Indus Valley from Iran via Baluchistan.

The Archaeological Evidence

Ceramics

Ceramics have traditionally been used to demonstrate the relationships of the Indo-Iranian area. Marshall (1931: 105, Pls. XCI-XCII) notes the similarity of a 'comb' motif found on Indus pottery (e.g. Hr. 47816, D.K. 5922) to those on Susa I ceramics. The step-patterns found on Susa I pottery and in the shell work of the Indus Valley constitute another parallel.

The Maltese-cross design appears frequently on Susa pottery and less frequently on Mohenjo-daro ceramics (Mackay 1938: 660). The connection was made by Mackay (1938: 653; Childe 1933: 5) of Black-on-red ware from Mehi and that of Mohenjo-daro. Mackay observed, however, that although Mehi ceramic motifs of *pipal* leaves and the comb are related to those of Mohenjo-daro, the animal-motif occurs at Susa and sites in northern Iran but not at Mohenjo-daro. Childe also claims Western affinities of pale-slipped ceramics found in Baluchistan and at Mohenjo-daro (1933: 7). Connections with Harappan ware and those found at Mehi and Kulli centre on a style 'which culminated in the Indus style' (Childe 1933: 7). Frankfort (1932: 70) states that the connections of flattening and elongating naturalistic motifs is parallel to Susa II. He looks to Baluchistan for the naturalism in Elamite art. Most of these early ceramic connections are too generalized and out of good stratigraphic context to be convincing.

The Black-on-grey ware found by Stein (1937) at Shahi Tump is, however, similar to that found at Shahr-i Sokhta I, increasing in II/III; Damb Sadat II/III; Bampur; Khurab; Damin; and Tepe Yahya IVC and B (Lamberg-Karlovsky and Tosi 1973: 40). No potsherd of this type, however, is known from the Indus Valley and yet Stein collected objects 'distinctive of Indian Cultures' at Shahi Tump (Childe 1933: 8).

Gordon (1947: 214 ff.) compiled a vast list of similar decorative motifs found in Iran, Baluchistan, and the Indus Valley. This work represents the most complete attempt at ceramic correlation. The basic similarities include the following (1) Scale-patterns are found at Sialk III, 1; Bakun B II; Sur Jangal; Amri ware; and at all sites which have Harappan ware. (2) Triangle-grooves are found on ceramics at Musyan; Fars; and on Harappan ware. (3) Chequer-pattern, alternates cross-hatched and diagonal cross, is found at Giyan VA, Sialk III, 5, Bakun A III, Chanhu-daro II. (4) End-to-base triangles are found at Giyan VA-C 13-14m, Sialk III7-7b, Bakun B II and A I, Ram Rud, Bampur, and Amri. (5) Sigmas are found at Giyan VC, 10-16m, Giyan VB, Bakun A III, Shahr-i Sokhta, Damin, Kalat-i Gird and seven Harappan sites. (6) Point-to-point triangles in

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

metopes are found at Giyan VC 11-13 m, Giyan VB, Sialk III 7-7b, Bakun A IV, Kalat-i Gird, Khurab and at four Harappan sites. (7) Triangle mesh is found at Giyan VB, 15-16m, Sialk III 7b, Bakun A III and Pandi Wahi. (8) Zig-zags are found at Giyan VB, Sialk III 6-7, Bakun AIII and Harappan levels at Chanhu-daro, Lohumjo-daro, Ghazi Shah and Pandi Wahi.

Gordon attributes these design similarities to a west-to-east movement of cultural influences into the Iranian borderlands of Seistan and Makran and hence to the Indus valley, from Susa, Giyan and Sialk. Two other patterns that find their way into the Indus valley during the Late Harappan period via Seistan include the cross-hatched concave-sided triangles and the fringe pattern (Gordon 1947: 218; Stein 1938: 114).

The ibex figure, triangular-hatched areas, and trees with fringed branches have been found at Bampur (and recently at Tepe Yahya) and are supposedly similar to those of Hissar IC, Giyan VB and Sialk III 5-6. These motifs were felt by Gordon to show connections between Hissar, Giyan and Sialk on the one hand and Kulli, Karchat, Shahjo-Kotivo and Chanhu-daro on the other. It appears that the palm is replaced by the pipal tree in the east (Gordon 1947:219).

Ibex horns in a zonal repetitive pattern appear at Tal-i Bakun, Tal-i Pir, Haraj, Shahi Tump, Khurab, Lohmo, Ghazi Shah, and Pandi Wahi (Majumdar 1934: Pl. 32-44; Gordon 1947: 220).

Gordon makes two major statements on the basis of this evidence: that 'there was without doubt an eastwards movement of Iranian pottery motifs via Seistan and Kandahar into the Quetta-Loralai-Kalat area on its way to the Indus'; and that 'with the exception of the bull and pipal motifs the whole of the repertoire of the painted pottery of the Indo-Iranian area originated in Iran' (Gordon 1947: 220, 230).

The generalized nature and vagueness of the pottery shapes and motifs mentioned by Gordon as well as conflicting stratigraphic contexts rule out the simplistic single decorative units as a valid proof of migration.

Ibex figures, for example, also occur at Bampur and Tepe Yahya IVB in a stratigraphic context dated several hundred years later than those found at Hissar IC, Giyan VB, and Sialk III 5-6 (Lamberg-Karlovsky, personal communication). In fact, there is a difference of at least six hundred years between Hissar IC and Giyan VB (Dyson 1965: Fig.1). The occurrence of triangular grooves at Musyan and on Harappan ware represents a chronological separation of 2000 years for a similar ceramic motif. The presence of end-to-base triangles on both Giyan VA-C and Sialk III 6-7b pottery also represents a chronological gap of several hundred years, let alone the major stratigraphic separation between Giyan VA-C and Amri.

The presence of zig-zags at Giyan VB and Harappan sites, including Chanhu-daro, cannot possibly be used as a satisfactory correlation between the two areas because of the chronological difference of nearly 2000 years. These examples represent just a few of the stratigraphic and chronological contradictions inherent in Gordon's correlations. It is obvious from these examples and recent archaeological theoretical and methodological studies that isolated design-motifs, shapes, etc. do not provide satisfactorily valid correlations. Rather, it is necessary to use a combination of factors, i.e., temper, ware type, total surface-decoration, etc., in conjunction with well-documented stratigraphic and chronological contexts. The type of correlations established by Gordon do not show a west-to-east migration from Susa, Giyan, and Sialk to the Mature-Late Harappan period of the Indus. In fact, they do not accurately represent valid criteria for the comparative chronology of the Iranian sites.

Gordon's argument that the vast majority of design-motifs found on Harappan wares derived from Iranian sources is also now invalidated in light of recent work by Mughal (1973) which indicates the derivation of Harappan ware indigenously. It is also evident that there is a vast and conflicting chronological differentiation in Gordon's correlations when these are closely examined.

Piggott (1943: 172 ff.), using a similar methodology, connects ceramic forms of Hissar IC with those of northern Baluchistan, notably from Periano Ghundai. Piggott also states that there is a common decorative tradition between these two areas, with a tendency to vertical elongation and a row of strokes beneath the belly of the animals. It is, of course, noted that the Hissar IC vessels portray the ibex while those from northern Baluchistan have the humped cattle. In the later Amri phase, Piggott relates the decorative motifs to those from Susa I, although the shapes are greatly different (1943: 173). Piggott feels,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

however, that these and other similar ceramic motifs and shapes represent 'parallel expression of a common theme rather than direct derivation one from another' (1943: 174).

Piggott (1946-23) also connects the Shahi Tump pottery from the cemetery with the early buff ware of Susa I and Khurab, and ascribes other materials from Shahi Tump to Harappan influence. He is, in essence, suggesting an 'oikumene' of ceramic shapes and motifs which suits the evidence but fails to elucidate what it means in terms of Iran-Indus Valley contact/ migration and to provide the correct interpretation based on stratigraphical information.

Khan (1964: 22 ff.) attempted to review and elucidate the connections between Iran and the Indus Valley using a methodology reminiscent of the 1940's. However, after stating that 'some of the designs of Harappan pottery resemble those found in Iran, but the majority are different from the Iranian' Khan proceeds to list the similar motifs, properly cautioning that 'the simple geometrical motifs . . .do not constitute any proof of relations between the painted pottery of Iran and the Indus Valley' (1964: 23). The ceramic decorative correlations are similar to those previously presented by Gordon (1947) and Piggott (1943; 1946) and do not appreciably strengthen the argument of contact.

Lamberg-Karlovsky (1972: 225 ff.), in a review of the evidence of Indus Valley-Mesopotamian contact, examined the few types of ceramics 'thought to indicate contact between the Indus and Mesopotamia, e.g. the perforated ware, knobbed ware and reserved-slip ware. Perforated wares are more common in the Indus but also occur in Iran at Hissar III (Schmidt 1937: 180, 187), Tureng Tepe (Wulsin 1932: 9, Pl. XIII 5), Shah Tepe (Arne 1945: 212), Yahya, Bampur, and Shahr-i Sokhta. This generalized type also occurs at Kulli (Stein 1937: VII, XX, XXV), Awaran (Khan 1964: 31), Sutkagen-dor (Mackay 1938: 645), and at Mohenjo-daro (Mackay 1938: 645, Pls. LII 29, LV 10, LXV 35). The variety of stratigraphic context and actual shapes eliminates the use of perforated wares as an effective argument for direct contact.

Knobbed wares are plentiful on Iranian sites and rare in the Indus Valley. Sankalia (1956) states that they represent connections between the Central Indian Chalcolithic sites and Iran. Knobbed wares are found at Shah Tepe (Arne 1945: figs. 167, 168, XXVII 6) Tepe Sialk (Ghirshman 1938: Vol. I, XXVIII 6), Tepe Yahya (Lamberg-Karlovsky 1970: fig.29; 1972: 225) and Mohenjo-daro (Mackay 1938: Vol. I 208; Vol. II Pl. LXVI 54). Knobbed wares from different sites, however, have little in common with each other beyond 'knobbing' and are not good indicators of any contact.

The reserved-slip wares are rarely found on Harappan sites: a few pieces from Mohenjo-daro (Mackay 1938: 184) and several from Lothal in a house with other trade-related artefacts (Rao 1973: 68). Mughal (1968: 207) suggests that these potsherds represent the Anjira ceramic tradition of incised ware with multiple wavy lines.

It is interesting to note that Quetta ware found at Shahr-i Sokhta (Tosi 1969), in the Quetta Valley (Fairservis 1956: 255, 321 ff.) and at Mundigak (Casal 1961) was used 'as definite evidence of the eastward spread of buff wares and the designs associated with such wares' (Gordon 1947: 227). Recent analysis by Biscione (1973: 105 ff.) and Gupta 1979: 122 ff.) demonstrate the connection of this ware, along with a variety of archaeological material, with southern Turkmenia and the Namazga sequence, rather than the eastward movement from Iran of the Buff Ware people of McCown.

In conclusion, it appears that although many isolated decorative motifs and shapes seem similar in ceramics found in the Indus Valley and in Iran, the overall impression is not one of convincing proof of direct contact/migration from Iran to the Indus Valley. All the similarities are too simplistic to support this hypothesis. The stratigraphic correlations between the areas are vague and do not provide any evidence of migration and little of direct contact. It is important to note that not only are ceramics 'poor indicators for documenting the existence of trade relations' (Lamberg-Karlovsky 1972: 225) but also of cultural contacts between Iran and the Indus Valley.

Metal Types

Metal artefacts have been an important class of objects in the establishment of cultural contact between the Indus Valley and Iran. Marshall (1931: 105, Pls. CXXVIII-CXXIX) states that connections between Susa and Mohenjo-daro 'are best paralleled by type I b blade-axes.' Mackay refers to the socketed adze-axe (1938: 640, Pl. CXX 27, CXXII 12) found at Mohenjo-daro

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

which is similar to a type of adze-axe with a long collared shaft found at Tepe Hissar III (Schmidt 1933: Pl. CXXVIII, fig. H 168), Shah Tepe, Tureng Tepe, Shahi Tump, and two ceramic moulds from Mohenjo-daro itself (Wheeler 1968: 75).

Mackay also correctly compares a copper pin, 11.4 cm in length, with a lapis lazuli bead set on its top, found at Mehi III 6.9 (Mackay 1938: 654; Stein 1931: 158, Pl. XXXII) with similar ones from Susa (*Memoires de la Delegation en Perse* 1905: 146, fig. 298). This type can be dated on stylistic grounds to the late third millennium B.C.

Piggott (1948) draws attention to five metal pins or rods with ornamented heads and a mace-head, found variously at Harappa, Mohenjo-daro and Chanhu-daro, which he felt provide evidence for 'trade and folk migrations across the Old World' (1948: 26).

The first type discussed is a double-spiral-headed pin. Two of these are known from the Harappan culture; one from Mohenjo-daro (Mackay 1938: 539, pl. C 4) and one from Chanhu-daro (Mackay 1943: 195, Pl. LXVIII 9). The pin from Mohenjo-daro was located 5.6 m below datum or in Intermediate III phase (Piggott 1948: 29) and the Chanhu-daro pin was found in hoard 2365, possibly Jhukar in date, although by some manipulation of the reported locus. Piggott discusses the wide distribution of this type geographically and chronologically. Wheeler (1968: 113-114) and Lamberg-Karlovsky (1972: 225) correctly point out that the weakness of this argument is precisely this widespread distribution. This type of pin is found at Hissar II and III, Sialk IV, and Anau III (Piggott 1948: 32).

Two animal-headed pins or rods also appear to represent close cultural contact between Iran and the Indus Valley. The pin from Harappa (Vats 1940: Vol. I. 390, Pl. CXXV 34 36) is datable to any Harappan phase. The one from Mohenjo-daro (Mackay 1938: 539 pl. C 3) can be dated to the Intermediate I level. Similar pins have been found in Iran at Susa from late fourth millennium B.C. contexts (*Memoires de la Delegation en Perse* 1934: 197 fig. 4; Perrot D.A.F.I.), Hissar III (Schmidt 1937: 197 ff. XLVIII), Luristan Gok Tepe, and Khurab (Stein 1937: Pl. XVIII; Piggott 1948: 34). The objection based on geographic and chronological diversity of similar objects is an effective argument against the use of these pins for evidence of cultural contact, but the Indus Valley pins do resemble those from Iran, particularly from Hissar III, not only in motif but in manufacturing technique as well.

The mace-head from Chanhu-daro (Mackay 1943: Pl. LXXIII 39) is datable to late Harappan or Jhukar levels. This mace-head is similar to the ones found at Hissar III (Schmidt 1937: H771, Pl. LII), Cemetery B at Sialk (Ghirshman 1938: Vol. II Pl. XXVI 10), Susa II (*Memoires de la Delegation en Perse* 1934: 215, fig. 59) and Tepe Giyan (Contenau and Ghirshman 1935). This type of mace-head does not resemble those from Susa or Giyan. It does appear similar to Hissar H771 but the Chanhu-daro example has a solid upper end and all the Hissar examples have a completely hollow shaft. Khan (196: 37) compares this piece to a Mohenjo-daro miniature plain vase and discounts its classification as a mace-head.

A shaft-hole axe found at Chanhu-daro (Mackay 1943: Pl. XXXII 25) in the Jhukar levels, similar to Susa types dated to the end of the third millennium B.C., has until now escaped notice. The coiled bracelets found in the Indus Valley, e.g. at Chanhu-daro (Mackay 1943: LXXIII 9-12), have extremely common counterparts in Hissar III only. Similar single-coiled bracelets are also found at Chanhu-daro and Hissar III but they are of an extremely common type over a large area and time-span.

Wheeler also attributes a copper/bronze knife found at Hissar III B to an Indus Valley origin based on the 'distinctively Harappan curved point' (1968: 113). This attribute is not specific enough to be used as a valid assumption of contact.

There are, of course, many other similar types of metal objects found in the Indus Valley and at sites in Iran, but these can also be attributed to many different eras and locales. It also seems difficult to accept that the Indus Valley Civilization, with a well developed copper/bronze industry at its inception, as well as nearby metal sources, should import or trade with Iran for simple metal objects (Heskel 1971). Lamberg-Karlovsky (1967: 145-162) states that the Indus Valley owes a great deal to Iran for the 'stimulus diffusion in the development of a metallurgical technology and production of similar function tool types.' If this is true, it must take place in a pre-Indus context since the metallurgical knowledge

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of the Harappa culture is at least equal to if not in some ways more advanced than that found in Iran.

Beads

Etched cornelian beads of Beck's type 1 (1933: 384 ff.) are relatively common on major Harappan sites (Wheeler 1968: 100; During Caspers 1971). There is evidence for the production of these beads at Chanhu-daro where 'unfinished, broken in boring and rejected for bad colour ones' were found (Mackay 1943: 186, 200, 210) and at Lothal (Rao 1973: 103) which Rao claims is the centre of production and origin for the technique. The technique used to etch the beads is complex (Beck 1933; Mackey 1943; During Caspers 1971).

Seven examples of these beads were found at Tepe Hissar, two in a child's grave (Schmidt 1933: 438, Pl. CXLIV) and five in another grave (Schmidt 1937; Pls. XXXV, LXVI), both of Hissar III C context. The beads from the child's grave were decorated with 'white incrusted incised circles,' while of the other, four have the familiar 'eye' motif and the fifth has a unique design.

An etched cornelian bead was also found at Shah Tepe II A (Arne 1945: 290, Pl. LXXVI fig.615) in grave B IIs7 (no. 600). It has a white etching of circles and strokes on the two concave sides. It is remarkably similar to those from Mohenjo-daro.

Etched cornelian beads identical to those from Harappan sites were also found at Susa D (Khan 1964: 33) and in a bathtub sarcophagus dated to the Akkadian period (During Caspers 1971: 91) at Susa. Stein (1937: 77) collected some of these beads from the Bampur Valley but Beck attributed these to a later period.

Etched cornelian beads were also found at Kalleh Nisar (Vande Berghe 1970: 73), which During Caspers (1971: 88-89) states:

> emphasizes the existence of the east-west track along the northern side of the central Iranian Salt Desert . . ., while the occurrence of etched cornelian beads at Susa indicates either case of access from southern Mesopotamia into Khuzistan or direct trade between Lothal and Susa.

Etched cornelian beads have also been found at Mughal Ghundai (Stein 1929: 47, Pl. XII), and Tor-Daria (Stein 1929: 70, Pl. XVI) located north of Dabar Kot, but these beads are from an early historical cairns and not useful for this discussion, (During Caspers 1971: 91). Three oblong etched beads were discovered at Mundigak (Casal 1961: 242, fig. 138; During Caspers 1971: 91) which have figures-of-eight designs. During Caspers (1971: 91) feels that these represent local imitations because their stratigraphic date is well into the second millennium B.C.

Two small cornelian beads have been found at Tepe Yahya, but both are from poor archaeological contexts. Both have geometric patterns cut into the surface and were later filled in with white pigment. Neither of these beads corresponds to Beck's types and both are probably late in date (During Caspers 1971: 92).

These beads have always been considered excellent indicators of trade/contact in between the Indus Valley, Iran and Mesopotamia (Woolley 1934: 309; Wheeler 1968: 101; During Caspers 1971). D.H. and M.E. Gordon (1940: 10) doubt the contemporaneity of the different locales for these beads, but the technique is so distinctive and the decorative motifs of the beads so similar that little doubt of direct cultural exchange can be continued. It is also worth noting that many of the cultural similarities of the Indus Valley with Iran are aligned with Hissar IIIC, although the a, b, c designation at Hissar is of little value stratigraphically.

A few beads with notched edges were found at Mohenjo-daro and Harappa. These tend to be made of faience or glazed paste and/or alabaster (Khan 1964: 34). A similar bead was found at a doubtful Hissar III B/C burial (Schmidt 1937: 231, Pl. XXIX) on necklace H 2856. This bead was rectangular 'with scalloped edges and elliptical cross-section'. Khan claims that these beads are all rhomboidal in section (1964: 34). Another bead was found in Hissar III B grave, H 2374, with serrated edges and three perforations through the straight side. Khan (1964: 35) states that Shah Tepe IIA also has similar beads.

Segmented beads are rare in the Indus Valley: roughly thirty have been found at the major Indus sites (Wheeler 1968: 99). Some small segmented beads occur at Shah Tepe (Arne 1945: 287 Pl. LXXV fig. 599) but since this type of bead has a wide geographical and chronological distribution, it does not represent good proof of contact between the Indus Valley and northern Iran.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Steatite/Chlorite Vessels

Steatite, or more correctly, chlorite vessels with carved decoration have been used as evidence of Iran-Indus Valley connections. Mackay (1938: 7) notes:

> a fragment of a vessel of chlorite schist unearthed at the level of 28.1 feet below datum; it has an intricate matting pattern carved upon it that is exactly duplicated on a double jar found at Susa II. (Contenau 1927: 643 fig. 448; 276 fig. 169).

Mackay (938: 321) goes on to state that this steatite vessel fragments is engraved in the same style as more numerous fragment in Elam and Sumer. This is an important piece since it is used to date the earlier levels at Mohenjo-daro to 2800 B.C. (Durrani 1964: 64).

Recent excavations at Tepe Yahya (Lamberg-Karlovksy 1970, 1973; Kohl 1974; During Caspers 1972) have firmly established that chlorite vessels with this type of decoration, called the Intercultural style by Kohl (1974: 226), were produced at Tepe Yahya IVB and sent westward and eastward. This type of chlorite vessel is also found at Bampur, Khurab, Shahdad, Mehi, and Shahi Tump. Khan (1964: 30) felt that this type of incised stone ware originated in the Bampur Valley. It is important to note that all the known motifs of this style on steatite/chlorite vessels found elsewhere were found at Tepe Yahya IVB_1 or early to mid-third millennium B.C. This particular motif on the fragment from Mohenjo-daro is present on 14.6 per cent of the decorated vessels from eastern Iran (Kohl 1974).

Incised grey ware, on which many chlorite motifs occur, has been found at Tepe Yahya, Shahr-i Sokhta, Bampur, Katukan, Khurab, and Damin (Lamberg-Karlovsky and Tosi 1973: 43). During Caspers (1972: 40) states that one incised Grey Ware pot was found at Susa Dd (Morgan 1912: fig. 116), and a single fragment came from Gabr-Maro, Shahi Tump. The Kulli-Mehi vases, which During Caspers sees as possibly later, deriving from the Bampur Ware, are restricted to the type sites and the late Mohenjo-daro levels (Durrani 1964: 56, 64, fig. I,1). She adds that the incised grey could 'be the poor man's version of a contemporary luxury item' (1970: 319) or represent an attempt 'by Bampur to steal the Yahya market with a cheaper copy' (1972: 71).

This new evidence effectively dissipates the arguments by Piggott (1943: 78) and Durrani (1964: 96) that carved chlorite vessels were produced in Baluchistan and traded east and west.

The other chlorite vessels from the Indus Valley consist of two compartmented specimens; one undecorated. the other decorated with hatched triangles (Marshall 1931: 356-57, Pl. 131). No compartmented boxes have been found at Tepe Yahya associated with the Intercultural style.

Kohl (1974: 226) notes, however, that 'incised triangles, like those above the base of a fragment from Shahi Tump (Stein 1937: 91) appear at Tepe Yahya in the Period IVA context.' This suggests a later trade, i.e. at the end of third millennium B.C., in soft stone vessels from Tepe Yahya to the Indus. It also strongly suggests a definite chronological distinction between the later trade and the earlier that must be remembered.

Although there are only a few chlorite vessels and a vessel fragment from Mohenjo-daro and Harappa that originate from Tepe Yahya, they provide strong evidence for some type of cultural contact between the Indus Valley and south-east Iran. It is worth noting, however, that there is a great deal of steatite around the Mohenjo-daro area, especially in Rajputana (Marshall 1931: 678-679). Steatite was also used in the production of Indus Valley seals and is the commonest material used in the manufacture of beads. There is little connection of Indus seals and beads to those found in Iran.

Mackay (1938: 663) also connects the design of an eagle with outspread wings and extended legs on a steatite pendant found at Harappa to a similar one found in Elam (Childe 1926: Pl. VI). This motif is similar, but not identical, to an incised eagle with spread wings and extended feet found at Tepe Yahya (Lamberg-Karlovsky 1970: 55, fig. 22, Pl. 19).

Unlike the argument presented for Indus Valley-Mesopotamian connections, seals provide a minute amount of evidence of Indus-Iran cultural contact. Mackay (1938: 656) states that a seal with a human figure with a steering oar on the poop of a boat found at Mohenjo-daro (Pls. LXXXII 30, LXXXIX A) is similar to one found at Susa (*Memoires de la Delegation en Perse* 1905: 23, fig. 4).

Langdon (1931: 593) and Rao (1973: 118) refer to a seal that is square and they imply it has a unicorn and a brazier, found at Susa. This, how-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ever, lends questionable support tocontacts since no reference is given.

The presence of the Indus Valley script from a seal impression on a plain orange-buff shard from Tepe Yahya IVA context is undeniable evidence of cultural contact (Lamberg-Karlovksy and Tosi 1973: 34, fig. 137). This seal impression resembles those from the early levels at Harappa (Vats 1940; Lamberg-Karlovsky and Tosi 1973: fig. 138).

Several other isolated types of artefacts have been used to strengthen Indus Valley-Iran connections. These include bird whistles, found commonly at Mohenjo-daro, Harappa, and Shah Tepe; double animal protomes found at Harappa and Hissar III, and marbles which come from many sites, including Anau III (Khan 1964: 38-40). None of these correlations provide incontestable evidence for cultural contact.

The problem then is the method and degree of cultural contact between Iran and the Indus Valley and the establishment of an explanatory model that is supported by the evidence to determine the importance of this contact.

Conclusion

The archaeological evidence of cultural contact between the Indus Valley and Iran varies in acceptability. Ceramic parallels tend to be generalizations of simple motifs and/or shapes and provide insufficient detail for the establishment of cultural contact. Some of the more individualistic and technically more complex materials can be used more confidently to show contact, such as etched cornelian beads, copper pins with lapis lazuli beads, and the seal-impression from Tepe Yahya IVA levels.

It is also evident that previous theories of wholesale population migrations and invasions such as McCown's (1946) are not acceptable in the light of archaeological evidence. Although emphasis is placed on those artefacts which show cultural contact, it must be remembered that most of the major physical aspects of the Indus Valley Civilization do not resemble their Iranian counterparts, e.g. city-plan, architectural plans and materials, script, metal-tool inventory, economic subsistence, etc., except in the most general and vague manner.

This general resemblance coupled with the few strong artefact connections has resulted in several new and important diffusionist frameworks to explain the cultural interaction between the Indus Valley and Mesopotamia.

Dales (1968; with Flam 1969) has been a strong proponent of an indirect trade network between the Indus Valley and Mesopotamia controlled by middlemen Kulli merchants from Pakistani Baluchistan. Dales cites the presence of Kulli and other Baluchistan material found at Umm-an Nar as evidence of Kulli trade with the Persian Gulf 'that suggests that they may have been intimately involved in the assumed communications between the Harappans and Mesopotamians' (Dales 1968: 17). This theory, while very attractive, has serious shortcomings. The Kulli pottery in Umm-an Nar consists of two vessels with a humped bull on them but without the traditional Kulli landscape. The incised Grey Ware and Black-on-grey ware cannot be limited to Kulli culture only, but rather to an extended cultural sphere of south-east Iran, Baluchistan, southern Afghanistan and Oman (Beale 1974: 42). Neither of these wares is represented in the Indus Valley.

Lamberg-Karlovsky takes issue with the Kulli merchant theory and states (1970: 80; 1971: 94; 1972: 224) that there is no evidence of Kulli culture at Tepe Yahya or anywhere in western Iran, although one potsherd with a humped bull was found in the 1973 season at Tepe Yahya in a IVA context (Beale 1974). Thus, Lamberg-Karlovsky states that the Kulli culture/merchants could not have been involved in overland trade, particularly considering Dales' excavations at Sutkagen-dor, Sotka-koh (Dales 1962) and recently at Bala-kot (1974).

Lamberg-Karlovsky (1972: 1974) states that the Central Place theory offers a more satisfactory conceptual and theoretical framework in which to discuss Indus-Iran-Mesopotamian relationships. The Central Place theory is an indirect model of contact. This theory also maintains that 'trade, rather than a result of urbanization may have been one of the major establishing factors in the rise of urban centres' (Lamberg-Karlovsky 1972: 225 ff.).

Lamberg-Karlovsky (1974: 13 ff.) correctly demonstrates how recent excavations at Tepe Yahya, Shahr-i Sokhta, Tal-i-Iblis, Bampur and Mundigak have necessitated a 'lessening of both the commitment to a Mesopotamian model of urbanization and the adoption of the diffusion of this model to include the Indus and all intervening areas of the Iranian plateau.'

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Dales (1965: 1973) was the first to emphasize the indigenous development of the Indus Valley Civilization from antecedents in Afghanistan and Baluchistan. Mughal (1970; 1973) has successfully shown the necessity for accepting the indigenous development of the Indus Civilization, although our knowledge is hampered by the inability to excavate the lowest levels of Mohenjo-daro and Harappa.

Dales (1973-165), using corrected radiocarbon dates, has established archaeological parallels between the Early Indus cultures and Mundigak IV, Bampur IV, Namazga IV and Susa D. The end of the Harappa culture now coincides with the end of the Ur III and Akkadian periods or 1900 B.C. (1973: 167).

One may briefly summarize some important points: (1) Most of the artefact correlations connect Mature or late Indus Valley sites with late third millennium Iranian periods and sites, e.g. Hissar IIIC, Yahya IVA; (2) There is little to indicate extensive trade between the Indus Valley and the Iranian sites prior to this time period; (3) There are substantial indications of trade between Baluchistan and Iran during this prior period and between Baluchistan and Soviet Turkmenia in the period even before this; (4) The nature of the Indus Valley Civilization differs substantially, except for vague generalized similarities, from that of the urban sites in Iran; (5) Recent archaeological work in Iran has eliminated our notion that cultural development in Iran was based on diffusion from Mesopotamia — rather, Iran developed contemporaneously with Mesopotamia and in a different way; and (6) The chronological time-lag between Iranian urban sites and early Indus urban sites is not necessary large enough to be significant.

The summary of these major points in conjuction with the archaeological evidence and theoretical arguments previously mentioned leads one to the conclusion that outside influence from Iran did not significantly affect the internal development of the Indus Valley Civilization. Rather, it appears most logical to assume that urban development in the Indus Valley is the result of similar processes that led to the development of urban sites in Iran and Mesopotamia. It is not possible, however, at this point, with the evidence available, to postulate what the processes involved are.

This conclusion does point out, however, that it would be more profitable to examine the internal development of the Indus Valley Civiliztion than to try and establish external reasons for its development.

One can further conclude, based on the amount of artefactual evidence, that only during the Mature-late Harappan phase was trade an important aspect of development. This trade with Iran was probably based on a Central place theory arrangement but was dependent on one of the small temporary but powerful cultures that existed in Pakistani Baluchistan. It is in this context of a succession of powerful localized tribal groups that the Kulli culture/merchants, among others, controlled the limited cultural/artefactual interaction between the Indus Valley and Iran.

REFERENCES

Agarwal, D.P. 1964. Harappan Culture: New Evidence for a Shorter Chronology. *Science.* 143; 950-952.

———. 1966. Harappan Chronology: a Re-examination of the Evidence. In *Studies in Prehistory.* D. Sen and A.K. Ghosh ed. Calcutta.

Allchin, Bridget and Allchin, Raymond. 1968. *The Birth of Indian Civilization.* Hammondsworth: Penguin.

Arne, T.J 1935. The Swedish Archaeological Expedition to Iran 1932-33. *Acta Archaeologica.* 6; 1-48.

———. 1945. *Excavations at Shah Tepe, Iran.* Stockholm: Elanders Boktryckeri Aktiebolas; The Sino-Swedish Expedition Publication. 27;7; Archaeology 5.

Beale, T. 1973. Trade Between the Indus and Mesopotamia. Harvard University (unpublished paper).

Beck, H.C. 1933. Etched Carnelian Beads. *Antiquaries Journal.* 13; 384-398.

Biscione, Rafaello. 1973. Dynamics of an early South Asian Urbanization: The First Period of Shahr-i-Sokhta and its Connections with Southern Turkmenia In *South Asian Archaeology* Hammond ed. 85-104.

Caldwell, J. 1967. *Investigation at Tal-i Iblis.* Illinois State Museum Preliminary Reports, number 9.

Caldwell, J. and Shahmirzadi, S. 1966. *Tal-i Iblis: The Kerman Range and the Beginning of Smelting.* Illionis State Museum Preliminary, number 7.

Casal, Jean 1961. *Fouilles de Mundigak.* Paris: Memoir de la Delegation Archeologique Francaise en Afghanistan 1.

Childe, V.G. 1926. *The Aryans.* New York: Alfred A. Knopf.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

———. 1933. Notes on some Indian and East Iranian Pottery. *Ancient Egypt and The East.*

Contenau, G. and Ghirshman, R. 1935. *Fouilles du Tepe-Giyan.* Paris: Paul Geuthner.

Dales, G.F. 1962. Harappan Outposts on the Makran Coast. *Antiquity.* 36; 86-91.

———. 1965. A Suggested Chronology for Afghanistan, Baluchistan, and the Indus Valley. In *Chronology in Old World Archaeology.* Ehrich ed. Chicago: University of Chicago Press; 257-284

———. 1968. Of Dice and Men. *J.A.O.S.* 88; 14-23.

———. 1973 Archaeological and Radiocarbon Chronologies for Protohistoric South Asia. In *South Asian Archaeology.* Hammond ed. Park Ridge: Noyes Press. 157-170

———. 1974. Excavations at BalaKot, Pakistan 1973, *Journal of Field Archaeology.* 1; 3-32.

Dales, G.F. and Flam, L. 1969. On Tracking Wooly Kullis and the like. *Expedition.* 12 (1) ; 15-23.

Dani, A.H. 1971. Excavations in the Gomal Valley. *Ancient Pakistan.* Special number. 5.

De Cardi, B. 1970. Excavations at Bampur, a Third Millennium Settlement in Persian Baluchistan 1966. *Anthropological Papers of the American Museum of Natural History.* 50 (2)

Dupree, Louis. 1963. Deh Morasi Ghundai; A Chalcolithic Site in South-Central Afghanistan. *Anthropological Papers of the American Museum of Natural History.* 50(2)

During Caspers, E.C.L. 1965. Further Evidence for Cultural Relations between India, Baluchistan, and Iran and Mesopotamia in Early Dynastic Times. *Journal of Near Eastern Studies.* 24 (102); 53-56.

———. 1971. Etched Cornelian Beads. *Bulletin of the Institute of Archaeology,* 10; London.

———. 1972. A Short Survey of a Still Topical Problem: The Third Millennium Arabian Gulf Trade Mechanisms Seen in the Light of Recent Discoveries in Southern Iran. *Acta Praehistorica et Archaeologica.* 3; 35-42.

Durrani, F., 1964. Stone Vases as Evidence of Connections between Mesopotamia and the Indus Valley. *Ancient Pakistan.* 1; 57-96.

Dyson, Robert 1965. Problems in the Relative Chronology of Iran, 6000-2000 B.C. In *Chronologies in Old World Archaeology.* Ehrich ed. Chicago: University of Chicago Press. 215-256.

———. 1968. Annotations and corrections of the Relative Chronology of Iran. *American Journal of Archaeology.* ser. 3 73 (4); 308-313.

Fairservis, W. 1956. Excavations in the Quetta Valley, West Pakistan. *American Museum of Natural History. 45 (2); 169-380.*

Frankfort, H. 1932. *Archaeology and the Sumerian Problem.* Chicago: The University of Chicago Press.

Frye, R. 1963. *The Heritage of Persia.* New York: World Publishing Co.

Gadd, C. J. 1932. Seals of Ancient Indian Style Found at Ur. *Proceedings of the British Academy.* 18; 191-210.

Ghirshman, R. 1938. *Fouilles de Sialk.* Paris: Paul Geuthner.

———. 1954. *Iran.* Hammondsworth: Penguin Books.

Gordon, D.H. 1947. Sialk, Giyan, and Hissar and the Indo-Iranian connection. *Man in India.* 27; 196-241.

———. 1950. The Early Use of Metals in India and Pakistan. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland.* 80; 55-78.

———. 1951. The Chronology of the Third Cultural Period at Tepe Hissar. *Iraq.* 8 (1) ;40-61.

———. 1955. The Pottery Industries of the Indo-Iranian Border: A re-statement and tentative chronology. *Ancient India.* 10 and 11; 157-191.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia, and the Indian Borderlands,* Vol. II. Delhi.

Hargreaves, H. 1929. Excavations in Baluchistan *1925. Memoirs of the Archaeological Survey of India.* 35; 1-89.

Haskel, D 1971. A Comparison of the Copper and Bronze Objects of the Indus Valley Civilization and the Central and Southern Indian Chalcolithic cultures. South Asia Regional Studies Department, University of Pennsylvania. (Unpublished) M.A. thesis.

Khan, F.A. 1964. *The Indus Valley and Early Iran.* Karachi: Government of Pakistan.

Kohl, Philip. 1974. Seeds of Upheaval. Unpublished Ph. D. Thesis, Department of Anthropology, Harvard University.

Lamberg-Karlovsky, C.C. 1967. Archaeological and Metallurgical Technology in prehistoric Afghanistan, India, and Pakistan. *American Anthropologist.* 69(2); 145-162.

———. 1970. Excavations at Tepe Yahya, Iran. *American School of Prehistoric Research Bulletin.* Number 27.

———. 1972. Trade Mechanisms in Indus-Mesopotamian Interrelations. *J.A.O.S.* 92(2); 222-229.

———. 1973. Urban Interaction on the Iranian Plateau: Excavations at Tepe Yahya 1967-1973. *Proceedings of the British Academy.* 59; 1-43.

Lamberg-Karlovsky and Tosi, M. 1973. Tracks on the Earliest history of the Iranian Plateau: Shahr-i Sokhta and Tepe Yahya. *East and West.* 23(1-2); 21-53.

Langdon, S. 1931. A New Factor in the Problem of Sumerian Origins. *Journal of the Royal Asiatic Society of Great Britain and Ireland.* 593-596.

Langsdorff, A. and McCown, D. 1942. *Tall-i Bakun: A Season of 1932.* Chicago: The University of Chicago Press.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

McCown, D.E. 1942a. *The Comparative Stratigraphy of Early Iran.* Chicago: The University of Chicago Press.

———. 1942b. The Material Culture of Early Iran. *Journal of Near Eastern Studies.* 1; 424-449.

McCown, D.E. and Ross, E. 1946. A Chalcolithic Site in Northern Baluchistan. *Journal of Near Eastern Studies.* 5; 284-316.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro.* New Delhi: Government of India Press.

———. 1943. *Chanhu-daro Excavations: 1935-36.* New Haven: American Oriental Society.

Majumdar, N.G. 1934. Explorations in Sind. *Memoirs of the Archaeological Survey of India.* Number 48.

Marshall, Sir John. 1931. *Mohenjo-Daro and the Indus Civilization.* London: Arthur Probsthain.

Meadows, R. 1973. A Chronology for the Indo-Iranian Borderlands and Southern Baluchistan 4000-2000 B.C. In *Radiocarbon and Indian Archaeology.* D.P. Agrawal and A. Ghosh eds. Bombay: Tata Institute. 190-204.

Mecquenem, R. and Scheil, V. 1934. *Mission Archeologique de Perse.* Vol. 25. Paris: Ernest Leroux.

Mecquenem, R., Contenau, G. Pfister, R. and Belaiew, N. 1943. *Mission Archaeologique en Iran.* Vol. 29. Paris: Presses Universitaires de France.

Morgan, 1905. *Memoires de la Delegation en Perse.* Vol. 8. Paris: Ernest Leroux.

Mughul, M. Rafique. 1970. The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan. Unpublished Ph.D. thesis Department of Anthropology, University of Pennsylvania.

———. 1973. *Present State of Research on the Indus Valley Civilization,* Karachi: Government of Pakistan.

Perrot, Jean 1971. Les rechercherches a Djaffarabad et dans les couches profondes de l'Acropole de Suse. D.A.F.I. Vol.1. Paris: Paul Geuthner.

Piggott, S. 1943. Dating the Hissar Sequence — the Indian Evidence. *Antiquity.* 17(68); 169-182.

———. 1946. The Chronology of Prehistoric North West India. *Ancient India.* No. 1; 8-26.

———. 1948. Notes on Certain Pins and a Macehead from Harappa. *Ancient india.* No. 4; 26-40.

———. 1950. *Prehistoric India.* Hammondsworth: Penguin Books.

Pumpelly, R. 1908. *Explorations in Turkestan 1904.* Vols. 1 and 2. Washington D.C.: Carnegie Institute of Washington.

Rao, S.R. 1973. *Lothal and the Indus Civilization.* Bombay: Asia Publishing House.

Sankalia, H.D. 1955. Spouted Vessels from Navdatoli and Iran. *Antiquity.* 29; 112-115.

Schmidt, E.F. 1933. Tepe Hissar Excavations 1931. *The Museum Journal.* 23(4); 323-477.

——— 1937. *Excavations at Tepe Hissar, Damghan.* Philadelphia: University of Pennsylvania Press.

———. 1939. *The Treasury of Persepolis and Other Discoveries in the Homeland of the Achaemenians.* Chicago: University of Chicago Press.

Stein, Sir M. Aurel. 1929. An Archaeological tour in Waziristan and Northern Baluchistan. *Memoirs of the Archaelogical Survey of India.* No. 37; 1-93.

———. 1931. An Archaeological Tour in Gedrosia. *Memoirs of the Archaeological Survey of India.* No. 43.

———. 1937. *Archaeological Reconnaissances in North-West India and South-East Iran.* London: Macmillan and Co. Ltd.

Tosi, Maurizio. 1969. Excavations at Shahr-i Sokhta. Preliminary Report on the Second Campaign Sept.-Dec. 1968. *East and West.* Vol. 19(3-4).

Vats, M.S. 1940. *Excavations at Harappa.* Calcutta: Government of India Press.

Vanden Berghe, L. 1970. La Necropole de Kalleh Nisar. *Archeologica.* 32.

Wheeler, Sir Mortimer. 1947. Harappa 1946: The Defenses and Cemetery R 37. *Ancient India.* No. 3; 58-130.

———. 1948. Iran and India in Pre-Islamic Times. *Ancient India.* No. 4; 85-103.

———. 1968. *The Indus Civilization.* Cambridge: Cambridge University Press.

Wooley, C.L. 1934. *Ur Excavations-The Royal Cemetery.* Philadelphia: British Museum and the University of Pennsylvania.

Wulsin, F.R. 1932. *Excavations at Turang Tepe.* Bulletin of the American Institute of Art and Archaeology.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

38

C.C. Lamberg-Karlovsky

An Idea or Pot-luck

Amidst the cultural diversity of the Baluch hills and of the plateau behind them, it is gradually becoming possible to trace interconnections which will ultimately (after much further research) give an element of cohesion both to the village-cultures themselves and to the two riverine civilizations which are in part rooted in them. (Wheeler 1953:9).

An increasing number of them (referring to the towns and villages of the Indo-Iranian borderlands) have been described and named, and their potential regional interest is sufficiently evident. But whether they will ever throw any very revealing light upon the origins of the great valley civilization is increasingly doubtful. None of them shows any clear primary and organic relationship with the Indus Valley culture, which remains obstinately a creation of its own lowland environment. (Wheeler 1968:9).

These two quotes, taken from the first and third editions of Sir Mortimer Wheeler's classic *The Indus Civilization*, suggest an important shift of attitude. In the first edition the quote appeared in a chapter subtitled 'Hill-villages'; in the second edition it became 'Towns and Villages'. In the first edition the 'hill-villages' were ultimately to become comprehensible as entities of 'cohesion' and shed light on 'the two riverine civilizations (the Indus and Mesopotamia) which are in part rooted in them'. With the passing of 15 years, Sir Mortimer expresses, in his third edition, a degree of pessimism. Following the completion of additional research, called for in his first edition, it becomes 'increasingly doubtful' to him that the 'Towns and Villages' will lead to an understanding of the 'great valley civilization'. Sir Mortimer Wheeler was perhaps unduly pessimistic and, if so, it was due to the incompleteness of the picture available to him at the time of writing.

Within the past two decades our understanding of the cultural conditions, reflected upon in the above two paragraphs by Sir Mortimer Wheeler, have been substantially increased. Wheeler, however, never took into consideration the importance of an entire geographical area which played a fundamental role in the emergence and relations of the Indus Civilization: Central Asia. Archaeologists never fully benefited from his thoughts on the excavation of a number of sites which have altered our conceptions. Into what framework would Wheeler have placed the recent excavations at Mehrgarh (Jarrige and Lechevallier 1979), Shortugai (Francfort and Pottier 1978), Shahr-i Sokhta (Salvatori 1978) and Tepe Yahya (Lamberg-Karlovsky 1970, 1973; Lamberg-Karlovsky and Tosi 1973), sites which have each, in different ways, affected our thinking on the Indo-Iranian borderlands and their relation to the Indus Civilization? In recent years, the importance of Central Asia as a distinctive zone of cultural interaction with the Indus Civilization has become apparent. This is evident with the recent discoveries of Harappan seals at Altyn Tepe (Masson 1977), the discovery of Harappan sites on the Oxus River (Francfort and Pottier 1978), and a Namazga V-VI site near Mehrgarh, in close proximity to a contemporary Harappan site (Jarrige 1979). Two fine comprehensive summaries of the Central Asian evidence and the Indian borderlands have been recently published, by S.P. Gupta (1979) and V.M. Masson and V.I. Sarianidi (1972; see also Tosi 1974 and Lamberg-Karlovsky 1973).

The importance of southern Turkmenia and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Seistan to the 'Towns and Villages' of Baluchistan, and in turn, to the Indus Civilization is becoming increasingly apparent. It is not, however, necessary to over-exaggerate the importance of Central Asia's distinctive urban process, nor its interaction with sites of the Iranian Plateau and the Indus Valley, by constructing ephemeral cultural entities as the 'Helmand Civilization' or 'Turan' (Tosi 1973, 1977). Such a view, as in advocating a uniformity of ecosystem and settlement within 'Turan' groups such contemporary sites as Hissar, Namazga Tepe and Mundigak as belonging to a single culture area, whereas in fact they share *very* limited cultural similarities in architecture, ceramics and other material remains.

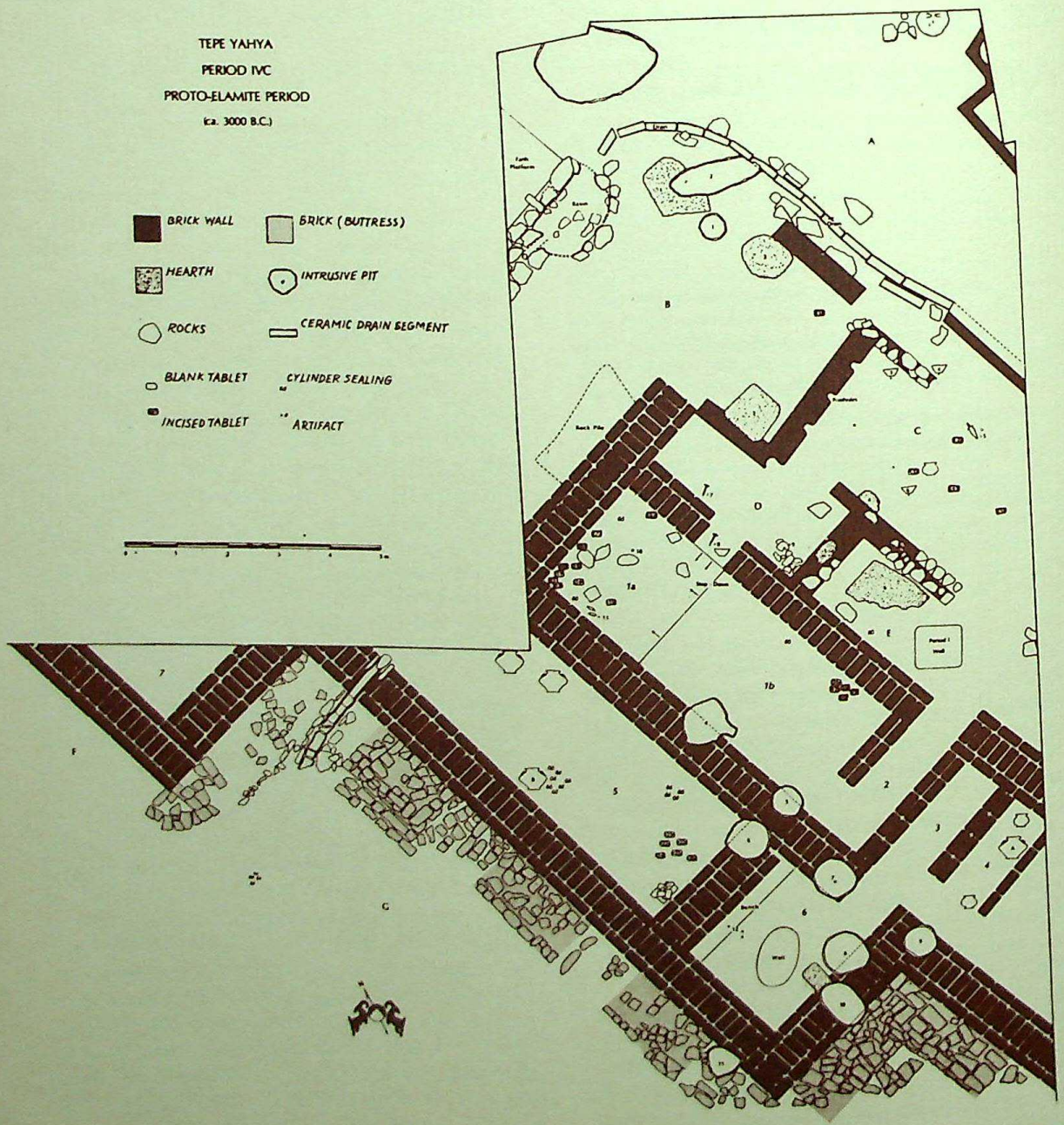


Fig.38.1. Tepe-Yahya: Proto-Elamite architectural complex

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

This short contribution documents an important association of two objects within a single building complex at Tepe Yahya in south-eastern Iran. Excavations at Tepe Yahya uncovered a single large building from which we recovered Proto-Elamite tablets, cylinder seals and sealings, and a distinctive ceramic with general similarities to Jemdet Nasr types (Lamberg-Karlovsky 1971, 1972). The Proto-Elamite tablets and sealings are identical to those recovered from Susa (Vallat 1973; Potts 1975). This building is to be dated to the end of the fourth millennium and represents a colonization of Proto-Elamites from south-western Iran in the distant south-east. Though the causes bringing about this colonization remain obscure (Amiet 1979; Lamberg-Karlovsky 1978), there can be little doubt that an eastward expansion of Proto-Elamite culture reaches Tepe Yahya directly, and indirectly influences Shahr-i Sokhta where a single Proto-Elamite tablet was discovered (Biscione *et al* 1978: 83). Though there is no evidence that Proto-Elamite expansion and colonization extended east of Tepe Yahya, the association of painted ceramics of Baluchistan type in the Proto-Elamite building at Yahya suggests an interaction with peoples to the east at a period 500 years prior to the Mature Harappan. The direct association of Baluchi ceramics with Proto-Elamite materials, and the specific association detailed below, recalls the famous sentence of Wheeler (1968:135):

> But it can at least be averred that, however translated, the *idea* of civilization came to the Indus from the Euphrates and Tigris, and gave the Harappans their initial directions or at least informed their purpose.

I would now like to point to a specific association, previously unpublished, which points to (1) an association of the Proto-Elamite (Period IVC) at Yahya with Central Asia, and (2) a resultant unresolved chronological problem. At Tepe Yahya in Room 4 a single pot, labelled on **fig. 38.1** as pot A, was uncovered. *Inside* this pot was found a single pit of *Prunus sp.* (identification by L. Constantini, unpublished) and, for Tepe Yahya, a unique bronze disc. What is of exceptional interest is the geographical area in which this type of bronze disc is typically found. Numerous such bronze discs have been recently published by Sarianidi (1977: 87; Pl. III) resulting from the Soviet mission in north-eastern Afghanistan. This unique disc from Tepe Yahya finds ready parallel in the corpus of bronze discs which are dated to the Dashli 3 period within the chronological sequence developed by the Russian mission for this area of north-eastern Afghanistan. Dashli 3 is in turn believed to date to the Namazga V-VI period (late third to mid-second millennium) which is contemporary with the Mature Harappan culture (Masson and Sarianidi 1972). At Tepe Yahya there can be no doubt of this bronze disc being directly placed *within* the Jemdet Nasr pot—thus providing a discrepancy of almost one millennium in date. We are at a loss as to how to resolve such a close typological parallel within such a great chronological discrepancy. It has been observed, however, by a number of scholars that the chronology advanced by Russian scholars for Central Asia (Namazga III-VI) is consistently too late. Only further research will resolve this chronological discrepancy. An additional parallel exists between another unique find at Tepe Yahya and its Central Asian counterpart. A large chlorite bead (Dia. 3.2 cm; Ht. 1.8 cm), elaborately carved, was recovered from the floor of Room 5 (illustrated in Lamberg-Karlovsky 1972; fig. 4-1). This finely carved chlorite bead finds parallel in Dashli 3 contexts where a considerable number have been found (Sarianidi 1977: 101, 105). The uniqueness of this bead at Yahya, or for that matter on other sites of the Iranian Plateau, and its common nature in Dashli 3 context argues for the area of its inspiration if not its origin. What is of significance is that the region of Central Asia was far from a regional isolate—the bronze disc at Yahya and the Harappan seals at Altyn Tepe all point to a degree of communication hitherto unsuspected. It is not the presence or absence of this communication that we should be concerned with for the archaeological remains attest to such communication as fact.

Far less obvious is the role and significance of such cultural contact and communication. The precise structure of regional exchange that brought Central Asia, particular sites of the Iranian Plateau, Baluchistan and the Indus and Mesopotamian civilizations of the third millennium into contact still eludes us. That there was such contact, however, cannot be denied. Kohl (1979) emphasizing the wide distribution of carved chlorite bowls in the mid-third millennium adopts the view of the modern economist Wal-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

lerstein (1974) and argues for a 'World Economy' of economic interdependence within the above areas, *c.* 2500 B.C. This view perhaps over-exaggerates the interactional patterns which brought the cultures of Asia from Mesopotamia to the Indus Valley, into contact. It becomes increasingly obvious, however, that the urban process of the third millennium in one area cannot be understood in the absence of an understanding of contiguous areas. In the process of integrating these areas we recognize an historical process usually ignored or muted in archaeological writings, the synergistic nature of structural forms. Synergy involves the production of wholes that are more than the sum of their parts. When archaeologists talk of 'cultures', ceramic taxonomy, technological change, ecology, etc. it should be within a framework of thought which includes feedback mechanisms. Without such consideration, one fails to deal with the kind of explanation which views social behaviour as a network of communication. I suspect, as unpalatable as it is to the archaeologist whose approach is of necessity materialistic, that behind such a unique association of finds described above, rests considerably greater communication (between distinctive cultures) than has survived the archaeological record. It is such minimal evidence that gives wing to Wheeler's concept that the 'idea' of civilization reached the Indus Valley from the world of Mesopotamia, via the Iranian Plateau and Central Asia.

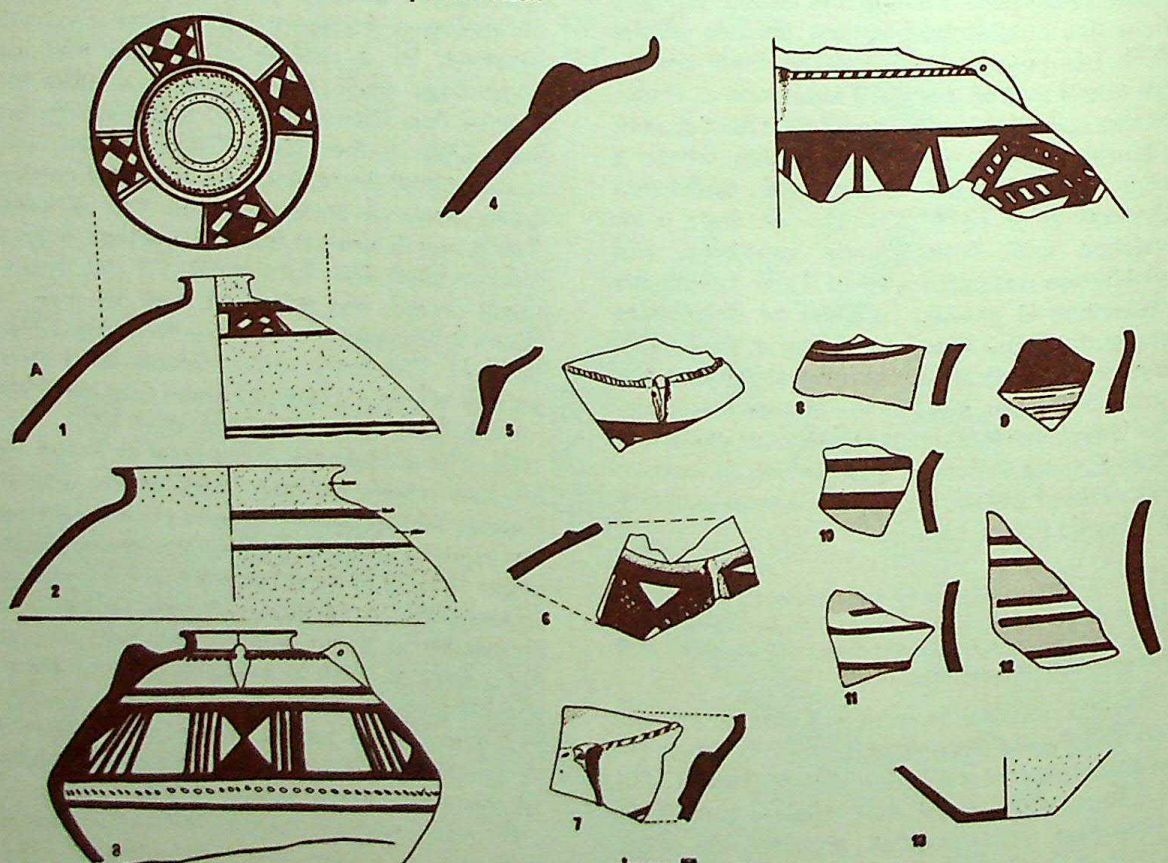


Fig.38.2. Tepe-Yahya: "Jemdet Nasr" type ceramics; Pot 3 yielded copper-bronze disc

REFERENCES

Amiet, P. 1979. Archaeological discontinuity and Ethnic Duality in Elam. *Antiquity*. Vol.LIII; 195-204.

Biscione, R. *et al* 1978. Shahr-i Sokhta, The Protohistoric Settlement and the Chronological

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Sequence. In *La Citta' Bruciata Del Deserto Salato;* S. Salvatori ed. Venice; 79-112.

Francfort, H.-P. and Pottier, M.H. 1978. Sondage Preliminaire sur L'etablissement Protohistorique Harappeen et Post-Harappeen De Shortugai. *Arts Asiatiques.* Vol. 34.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia, and the Indian Borderlands.* B.R. Pub. Corp., New Delhi.

Jarrige, J.-F. and Lechevallier, M. 1978. Excavations at Mehrgarh, Baluchistan: Their Significance in the Prehistorical Context of the Indo-Pakistan Borderlands. In *South Asian Archaeology 1977.* M. Taddei ed. Istituto Universitario Orientale. Naples; 463-535.

Jarrige, J.-F. 1978. Recent Excavations at Mehrgarh. *Paper Presented at the Fifth International Conference of South Asian Archaeologists.* Berlin; August 6-11.

Lamberg-Karlovsky, C.C. 1970. *Excavations at Tepe Yahya.* American School of Prehistoric Research Bulletin. No. 27. Peabody Museum. Cambridge.

———. 1971. The Proto-Elamite Settlement at Tepe Yahya. *Iran.* Vol. IX; 87-96.

———. 1972. Tepe Yahya 1971—Mesopotamia and the Indo-Iranian Borderlands. *Iran.* Vol. X; 89-101.

———. 1973. Urban Interaction on the Iranian Plateau. Excavations at Tepe Yahya 1967-1973. *Proceedings of the British Academy.* Vol. LIX; I-43.

———. 1973. Prehistoric Central Asia: A Review. *Antiquity.* Vol. XLVII, 185; 42-48.

———. 1978. The Proto-Elamites on the Iranian Plateau. *Antiquity.* Vol. LII; 114-121.

Lamberg-Karlovsky, C.C. and Tosi, M. 1973. Shahr-i Sokhta and Tepe Yahya: Tracks on the Earliest History of the Iranian Plateau. *East and West.* Vol. 23, 1-2; 21-54.

Kohl, P. 1979. The 'World Economy' of West Asia in the Third Millennium B.C. In *South Asian Archaeology,* 1977. M. Taddei ed. Naples.

Masson, V.M. 1977. Proto-Indian Seal Type from Altin-Depe. *Vestnik Dervnii Istorii;* 147-155.

Masson, V.M. and Sarianidi, V.I. 1972. *Central Asia, Turkmenia Before the Achaemenids.* Thames and Hudson. London.

Potts, D. 1975. The Late Fourth Millennium Universe of a Highland Community in Iran, Problems of Proto-Elam and Jemdet Nasr Mesopotamia. (Unpublished M.A. Thesis. Department of Anthropology; Harvard University).

Salvatori, S. 1978. *La Citta' Bruciata Del Deserto Salato, (The Burnt City in the Salt Desert).* Bilingual text. Erizzo Editrice. Venice.

Sarianidi, V.I. 1977. *Drevnii Afghanistana.* Atrademia Nauk. Moscow.

Tosi, M. 1973. Early Urban Evolution and Settlement Patterns in the Indo-Iranian Borderlands. In *The Explanation of Culture Change.* Colin Renfrew ed. Duckworth. London.

———. 1974. The North-Eastern Frontier of the Ancient Near East. *Mesopotamia.* Vol. VII-IX; 21-76.

———. 1977. The Archaeological Evidence for Proto-State Structures in Eastern Iran and Central Asia at the End of the Third Millennium B.C. In *Plateau Iranien et l'Asia Centrale des Origines a la conquete Islamique.* C.N.R.S. Paris.

Vallat, F. 1973. Les Tablettes Proto-Elamites de l'Acropole (Campagne 1972). *Delegation Archaeologique Francaise en Iran.* Vol.3; 93-104.

Wheeler, R.E.M. 1953. *The Indus Civilization.* Cambridge University Press.

———. 1968. *The Indus Civilization.* Cambridge University Press (3rd edition).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

39

Shashi Asthana

The Place of Shahbad in Indus-Iranian Trade

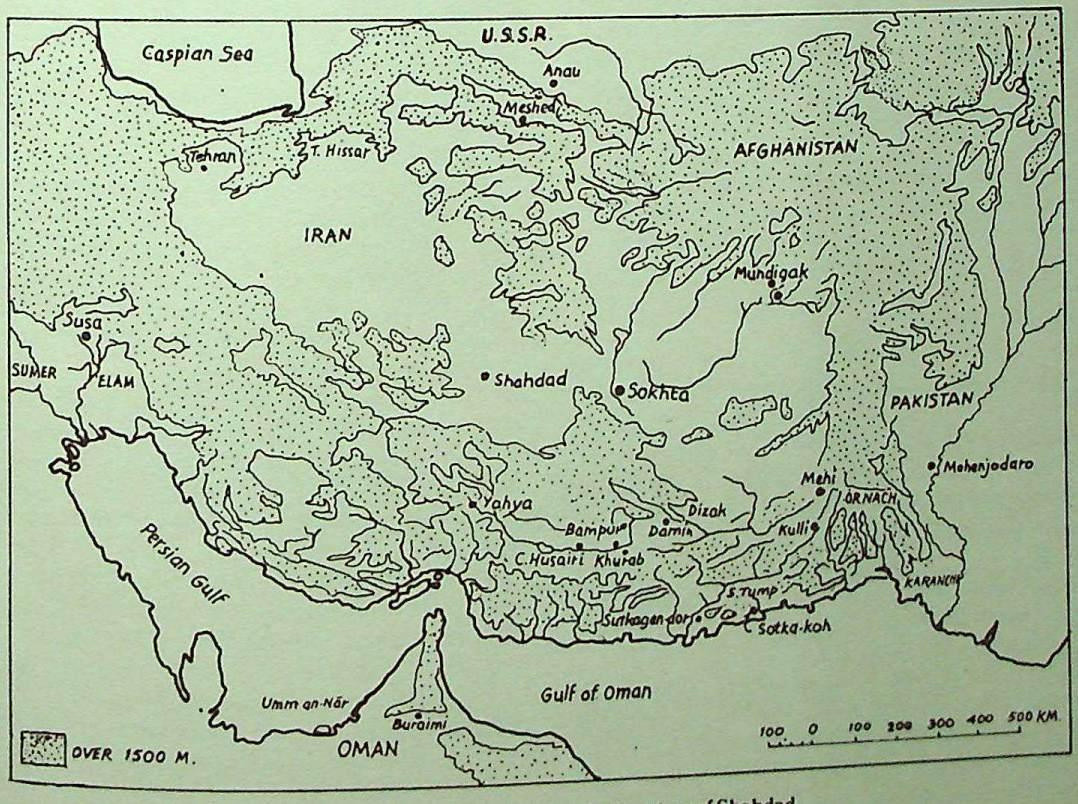


Fig.39.1. Map of Iran showing the locationpof Shahdad

Ever since the discovery of a large number of objects made of lapis lazuli, cornelian, steatite-chlorite, turquoise, alabaster, copper and silver at Harappa, Mohenjo-daro and other Indus sites, efforts have been made to locate the sources of these minerals and metals in other parts of the Old World; for, so far as these are concerned, the Indus Valley itself is practically barren. For some, like lapis and turquoise, the sources have been more or less settled, but not for the others. A number of areas, such as the Soviet Central Asia, Iran, Afghanistan, Baluchistan, interiors of India and Persian Gulf have been suggested as the probable sources for steatite-chlorite, copper,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

silver, etc. A few archaeological sites have also been located in these areas which may have played an important role in transmitting these metals and minerals from source-areas to consumer-areas, including the Indus towns, during the 3rd millennium B.C. Here we are concerned only with such sources and commerical centres situated in south-eastern Iran which might have attracted the Harappans in search of the so much needed raw materials.

During the last decade, two archaeological sites on the Iranian plateau—Tepe Yahya (Kirman) and Shahr-i Sokhta (Siestan)—have been repeatedly suggested as having commercial links with the Indus Valley (Lamberg-Karlovsky & Tosi 1973). But besides these, there is an important, though less known site, Shahdad, situated at the edge of Dasht-e-lut in the Kirman region. It is now increasingly realized that it might also have played a vital role in the Harappan long-distance trade. Its crucial location—in the heart of the Kirman region at the junction of several routes—and the rich material that remain unearthed there seem fairly indicative of this suggestion. Unfortunately, Shahdad has not received sufficient attention in Iranian archaeology; hence a short digression to sketch some less known facts about Shahdad. **(fig. 39.1)**.

Not much has been published on the excavations at Shahdad except one small catalogue in French (Hakimi 1972) and two separate articles in English (Hakimi 1973) and Persian (Kaboli 1974). An Italian expedition explored the area for a short period and circulated the results in a cyclostyled paper (Salvatori 1977). In 1977, on her tour to Iran, the authoress had the occasion to examine some unpublished material from this site and her findings form the basis of the following details.

The main mound of Shahdad lies 5 km to the east of the town of Shahdad and covers an area of several square kilometres. It is situated on the edge of Dasht-e-lut, a large Iranian desert, with an altitude of 430 metres. It is watered by the river Derakhtangan which overflows in winter but is a mere trickle in summer. An Iranian expedition, under the leadership of Hakimi, began a dig at the site, particularly in the graveyard in 1969 (Hakimi 1973). The operation continued till 1977. The settlement area was, however, located only in 1976.

To begin with, some trial trenches were laid in the graveyard at three different places—A, B, and C. In all these places, a number of tombs have been encountered. The recoveries from the grave include decorated and plain pottery, metal vases and implements, marble and steatite-chlorite vases, as well as beads of different semi-precious stones. In Area A alone, excavations continued over a period of four years. The results have clearly shown the rich archaeological potential of that site and its neighbourhood. The material unearthed from the graves attests to the industrial nature of the settlement to which the buried people belonged. The emphasis was obviously on local production; had it not been so, the Shahdadians, probably, would not have buried these objects in such large numbers in the graves.

In 1977 two Italians, Salvatori and M. Vidale explored this area on the invitation of the Iranian Government (Salvatori 1977). Their exploration, in spite of its being limited in time and space, has brought to light some important evidence which greatly aids the vital issues of chronology and industrial nature of this site The explorers have detected three major areas of specialized craftsmanship—metal, pottery and semi-precious stones (Salvatori 1977). The whole area has been divided, for convenience, into divisions and numbered 1-37 which will be referred to later in this paper.

The typology of antiquities from Area A, places this culture in the second half of 3rd millennium B.C. while those discovered in the limited investigations in Area B and C, take this site to an earlier date: the first half of the 3rd millennium B.C. (Hakimi 1973: 64-65).

However, the Italians have dated this culture to the 4th-3rd millennium B.C. on the basis of certain indications (Salvatori 1977). During the sruvey, a certain number of fragments of straw-tempered ware, reddish or brown in colour, very similar to the Lalehzar Coarse Ware of Tal-i Iblis I-II together with fine, painted, buff Ware with black decoration on red or red-brown slip have been discovered. At the same time, a few shards of a thin, walled, sub-cylindrical bowl motifed in a dense Chevron pattern have been collected. This pottery is similar to the pottery of Yahya V B-A. The lithic blade industry also reveals similar cultural traits of Yahya. Literary evidence also suggests its date in the 4th millennium B.C. (Kramer 1952), for example, the Sumerian epic of Enmerker and Lord of Aratta. The location of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the kingdom of Aratta is debatable but it is now generally realized that it could be identified with Shahdad as the geographical description and location of Aratta in this epic indicates. It is significant that this identification makes Shahdad

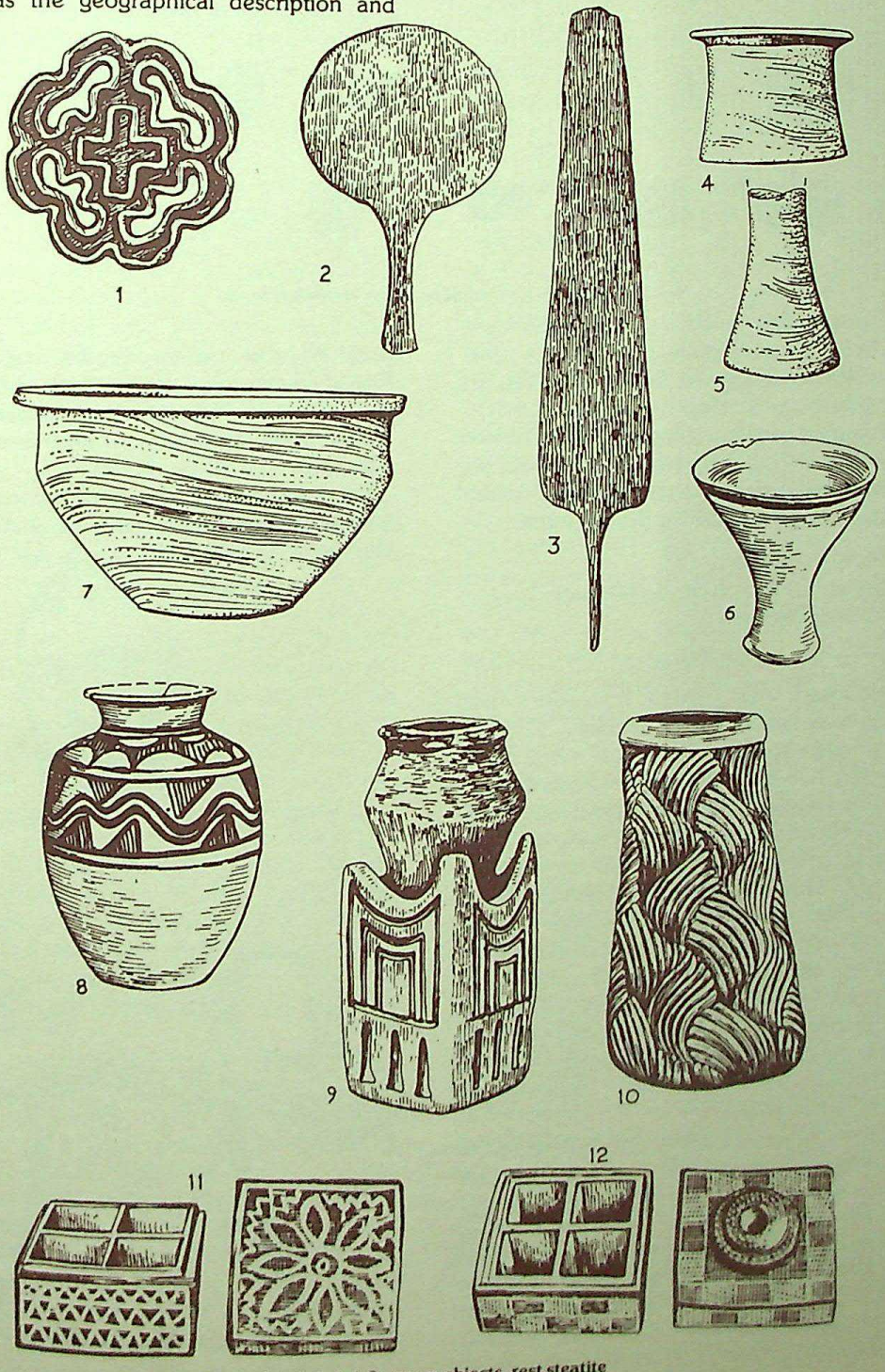


Fig.39.2. Shahdad: 1-3 copper objects, rest steatite

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

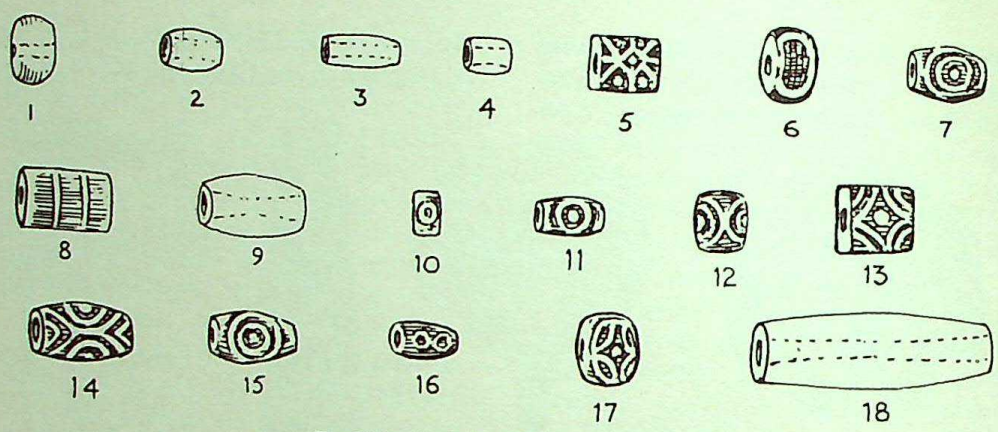


Fig.39.3. Shahdad: Etched carnelian beads

contemporary with the Uruk dynasty of Mesopotamia, in the 4th millennium B.C. Thus, it is possible that its beginning was earlier than the 3rd millennium B.C. probably the 4th millennium B.C.

The large number of fragments of different objects that are still found scattered on the site provide a real insight into its past. The cultural assemblage can be divided under three heads.

(1) Metal Production
(2) Stone Production (semi-precious)
(3) Pottery Production

Metal Objects

The graveyard has yielded numerous metal objects, both intact and fragmentary. They include spouted bowls, spouted pots, nails, spear-heads **(fig. 39.2/3)**, picks and standard seals; decorative fragments and ornamental pins, bangles, ear rings and mirrors. Most of them are made of bronze and copper, but a few of them are made of an alloy of silver and lead. Some of these objects reflect a very high level of workmanship: four axes with animal heads, one axe showing a fish on one side of the blade and a scene depicting the fight between a lion and a bull on the other; two plates with a scene in relief showing fish and gazelles are of great interest. Of all the metal objects, the standard is most famous (Hakimi 1973: 65-66).

Besides these, a number of copper-bronze seals with figures in raised outline have also come to light (Hakimi 1973: 66). One of them **(fig. 39.2/1)** is clearly of Turkmenian origin (Hakimi 1972: pl.XXI B). At the present state of our knowledge, it is difficult to locate its origin but it possibly filtered from Shahr-i Sokhta of the Siestan region which has also yielded similar seals. We do not, however, entirely rule out the possibility that it came from Namazga Depe, the Period III township, from where Shahr-i Sokhta also seems to have received these seals. Metal beads, made of an alloy of silver and lead, have also been found here.

All these metal objects leave no room for doubts about the high quality of local production. We know that metallurgy was not new to this

Fig.39.4. Shahdad: Terracotta male bust

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

region, its antiquity goes back to the 5th millennium B.C. at Iblis (Caldwell 1967). The local production of metal objects is further attested to by the discovery of smelting furnaces in the excavated areas A and C (Hakimi 1973: 66) as well as in explorations in nearby areas in the form of circular and rectangular mud and mud-brick structures (Salvatori 1977). The fairly large production of metal objects can easily be made out from the nature or rejects found in a 500 × 500 m area: it was found fully covered with copper slags. Some fragments of crucibles and a few scoriae collected during this survey reinforce the theory that this was the metal production area of the town. Salvatori (1977) feels that the area of distribution of these items was so vast that it is difficult to think that this workshop was meant exclusively to meet the internal demands of the township.

Stone Objects

Objects made of cornelian, agate, chalcedony, calcite, chlorite-steatite, turquoise,alabaster and lapis lazuli have been discovered in large numbers in the Shahdad graves (Hakimi 1973: 66). While alabaster **(fig. 39.2/4-7)**and chlorite-steatite are worked in the form of pots and pans-bowls, cups, vases, etc. cornelian, turquoise and lapis were used for making beads, spacers, etc. Except lapis lazuli, all the semi-precious stones were available to Shahdadians from near big areas; lapis, of course, came from Badakshan. The grave and the working areas at Shahdad both have yielded a number of chlorite-steatite vases in different shapes, some of which are unique. This makes it clear that Shahdadians were probably the original manufacturers. The steatite objects from Shahdad are decorated with geometric and animal motifs, both engraved and in relief. A few of these objects may be noted (Hakimi 1973: 66).

(1) A cylindrical cup decorated with six animals. A bull with long horns is shown facing a lion while in between there is a serpent with a raised tail. An animal, probably a leopard, is depicted on the back of the lion.

(2) A few small vessels in the form of a house with a vessel at top (Hakimi 1972: pl. XV, a-c). Similar vessels have been found at Susa and Yahya **(fig. 39.2/9)**.

(3) A few bottles with a square base. Concentric circles decorate the body (Hakimi 1972: pl. IX D).

(4) Vessels of different forms decorated with different types of mat designs **(Fig. 39.2/10).** Some vessels are decorated with concentric circles.

(5) Compartmented square boxes, with coiled serpents moulded on the lids **(Fig. 39.2/11-12).** This type was known in the Indus Valley and Tarut in the Persian Gulf (Hakimi 1972: pl. XIV a, b).

Being part of the recoveries from the grave, all of them are in good condition and give an idea of their orginal beauty. The graves have yielded plenty of cornelian beads in different shapes. Of these, etched cornelian beads are of special significance since they are typically the Indus type.

Lapis lazuli objects have been found in tombs in abundance, in the shape of beads, while, in the working-areas, they are rare.

Stone seals were also common, including cylindrical seals. One of the alabaster cylinder seals (Hakimi 1972: pl. XXVI), shows, the goddess of vegatation kneeling and surrounded by ears of corn. To her right, by a tree stands the protective goddess of animals, wearing a long skirt and with two horns on her head, with caprids at her side. Between the two goddesses, a sheep has been placed on a platform. Some other cylinder seals in limestone and alabaster depict the goddess of fertility.

Local production of most of these objects is almost certain. During the survey, a very large expanse has been explored and supporting evidence collected, in the form of drills and beads in various stages of manufacture (Salvatori 1977). On the basis of distribution of drills and drill-heads and beads, as many as sixteen areas where the possibility of manufacturing the objects was absolutely certain, have been located. Thousands of drills were found scattered on the surface. In Area 17, the Italian explorers collected 700 drills of flint within a very short time. 1,100 more drills were collected in a nearby area. These drills belong to three main categories:

(1) The larger part of the collection represents micro-drills obtained from burins (88.74%);

(2) The seond type is obtained from short thick blades (8.86%);

(3) The third type consists of drills not only of flint but also of basalt with a cylindrical functional part and a central depression in the head (2.40%).

The first two types are similar to the drills found

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

at Tepe Hissar while the last one has its parallel at Shahr-i Sokhta and Chanhu-daro. The drills, though normally used to make holes in beads have however, also been used to execute geometric patterns on chlorite stamp seals. These thousands of drills in such a vast working area not only indicate the production of a large number of stone objects, including beads, but also furnish a clue to the commercial activities at Shahdad.

Pottery

As far as the Shahdad pottery is concerned, it includes forms commonly found in areas east of Shahdad. Mesopotamian pottery was not favoured at Shahdad while at Yahya, though close to Shahdad, we have a few specimens of Jemdet Nasr pottery. However, Shahdad pottery has its parallel at Bampur, Khurab, Damin, etc. Recent advances in Baluchi archaeology make it amply clear that Baluchi influences on all this pottery cannot be ruled out. Regarding pottery, four factors are important (Hakimi 1973: 64: 65).

Buff Ware and Red Ware with various designs in black have been discovered. Further, the designs and shapes of these pots are comparable to the pots from Bampur, Khurab, Damin, Dehgazi and Tepe Yahya **(fig. 39.2/8)**. Representations of animals and stylized flowers were common to bowls, cups and jugs. Large and small jars were also common to both: the Buff Ware and the Red Ware.

(2) Black-on-grey ware has been found in very limited quantity. Its limited distribution on other south-east Iranian sites show that they were imports.

(3a) A few fragments of straw-tempered ware, red or brown in colour, similar to Lalehzar Coarse Ware of Iblis I-II, have been collected during exploration. Along with this, a few shards of fine Buff Ware with black painted designs on red or red-brown slip have been gathered.

(3b) A few pot-sherds from this site belonging to thin walled sub-cylindrical bowls with a dense chevron pattern can be compared with the pottery from Yahya V B-A and Iblis I—II.

These ceramics clearly show that Shahdad was in close contact with major sites in the Kirman region.

(4) The Grave-yard has yielded red ceramic with incised marks and pictographic signs. Normally, they are marked under the neck of the vessels. More than 700 potsherds have been found bearing these signs, whether they occurred singly or in groups of five distinct symbols. The signs were made on clay before firing and were either incised with a metal or a stone stylus. Signs both simple and complex, are available in abundance. Several graffiti signs can occur on one pot. Hakimi refuses to take them as the potter's mark and believes that each of these signs was a word, which grouped with others, takes the form of a phrase. A Proto-Elamite inscription, discovered on a small vase, has led Hakimi to form this opinion.

The local production of these wares, excluding the grey ware, is beyond doubt. The discovery of potters's kiln in excavations and explorations supports this belief. Two kilns found in the excavations are in poor condition but their bases with fine painted pot-sherds are intact. In explorations also, two sub-areas 1 and 4, have been detected as the potters' areas since numerous kilns have been found here. Four kilns in sub-area no.4 contained some pot-sherds of the 4th millennium B.C., while 20 kilns in sub-area no.1 are devoid of pottery (Salvatori 1977).

Significantly enough, none of the potsherds has revealed Mesopotamian influence.

Three life-size male busts of clay **(fig. 39.4)** have also been unearthed in the graves (Hakimi 1973: 66). These are unique to the Iranian Plateau during the 3rd millennium B.C. This seems to be the result of Mesopotamian influence as the tradition of making life-size statues in stone was prevalent in Mesopotamia and nowhere else.

This short survey of explorations makes Shahdad a prosperous and active town in the Kirman region with thriving crafts in metal, pottery and semi-precious stones, producing a large number of commodities both in quantity and quality. It appears that the natural resources of Kirman have been exploited by Shahdadians extensively. This large scale production, vast working areas for different crafts, the number of seals and rich natural resources in the surrounding regions and Shahdad's crucial location at the crossing of several routes indicate that this town had grown up as a commercial centre, engaged in metal and chlorite vase trade with the east and west.

Commercial Interaction

We shall now try and ascertain Shahdad's role in the West Asian trade of the Harappans.

Minerals like steatite-chlorite, alabaster, corne-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

lian, lapis lazuli, and metals like copper and gold were the main commodities for export and import in the ancient world. All these items were extensively used both by the Indus people and the Mesopotamians. As both, Indus and Mesopotamia, were completely devoid of these raw materials, they certainly exploited a region like Kirman which is still known for its rich resources, e.g. copper, silver, lead, chlorite-steatite, alabaster and turquoise. Sites like Shahdad and Yahya came into existence probably as entre pots since, geographically, Kirman is centred between the Indus and Mesopotamia. Kirman was, in fact, the eastern-most boundary of the effective Mesopotamian culture-area as well as the western-most limit of the effective Harappan culture-area. This can easily be inferred from the pottery assemblage and other items of Shahdad. The pottery is comparable to the pottery found in areas east of Shahdad, while the non-pottery artefacts are akin to the cultural assemblages of the area west of Shahdad. As such, it seems this site was a big commercial centre and served as a meeting-ground for the Indus-Meopotamian merchants for receiving raw materials as well as finished goods.

A few items are important for this study: steatite-chlorite, alabaster, cornelian, turquoise, lapis lazuli, copper, silver and lead and the goods made from them.

Steatite-Chlorite

Minerals like steatite-chlorite, alabaster and cornelian are prevalent in Saudi Arabia, Iran, Afghanistan, Baluchistan, Pakistan and India. The use of these minerals were fairly common in Harappan sites for making seals, beads and decorative objects. That may indicate that the sources lay in the areas regularly visited by the Harappans. A number of such sources have been suggested by different scholars. Here, however, we are concerned only with the sources lying west of the Indus: those of Baluchistan and Iran.

In Baluchistan, the district of Zhob has two potential locations but whether they were mined in ancient times or not, is not definitely known. Another source lies in the Soghun Valley of the Kirman region in Iran. People from Tepe Yahya and Shahdad possibly made the maximum use of these sources. The Harappans, who were in commercial contacts with these cities either by themselves or through middlemen, seem to have a significant supply of this material from the Sind and Punjab areas. At present, other major sources are not known.

As far as the finished goods are concerned, at least one category of objects — 'stone vases' — is found over a large part of the Old World. It is well known that steatite-chlorite vases formed one of the main commodities of trade in West Asia during the third millennium B.C. This single item, in its various shapes and designs, had surpassed all other commodities of that period in the extent of its distribution which spread from Syria to the Indus including the Persian Gulf. We shall concentrate, here, on a special type of stone vase — 'Compartmented Vase' — which has been found only at Mohenjo-daro, Shahdad and Tarut.

CHLORITE: Two fragmentary chlorite vases— square with four compartments; decorated with zig-zag designs on the outer surface in two registers; marked by holes at the top four corners (for hanging-cords); and with a proposed lid—have been discovered at Mohenjo-daro (Marshall 1931: pl. CXXI 36-37). Chlorite vases have been found at Mehi, Shahi Tump and in the Dasht Valley but they are the common variety prevalent in the Old World. The Mohenjo-daro pieces are extremely important for visualizing the trade relations between the Indus cities and Shahdad. So far, Yahya alone has yielded objects similar to these and in various stages of manufacture; only finished objects in this material are found at other sites(Kohl 1975; 20-21). The question that now arises is extremely significant: did Yahya alone supply these vases to the whole Old World? Lamberg-Karlovsky has so far maintained that Yahya was the only workshop, but that, to our mind, may not be the case. Shahdad has produced specimens both in quality and quantity, far better and far more in number than the Yahya examples. At the same time, they include all the types which the Old World ever had while the Yahya collection does not represent all types—for example, the four compartmented vases are not found. This type of vase has, however, its exact parallels at Shahdad in large numbers (Hakimi 1972: pl. XIV, a-b).

CORNELIAN: Cornelian is the other semi-precious stone of which we have beads in various shapes, at various places, in the Old World. In some places, cornelian was locally available, in the river-beds or near the outcrops of crystalline

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

quartz formations, but more often, it was imported. Of the several varieties, the etched cornelian beads are of special significance for trade contacts as they represent typical Harappan workmanship and decorative designs **(fig.39.3/1-18)**. They are widely distributed in Harappan India—Mohenjo-daro, Harappa, Gumla, Amri, Banawali, Kalibangan, Surkoada, Lothal and Chanhu-daro. Outside the Harappan frontiers, they have been found at several Mesopotamian sites, such as Al-Hiba, Nippur, Ur, Kish, Tell Asmar; Iranian sites, such as Susa, Yahya and Shahdad; Bactrian sites, such as Shartugai and a few Persian Gulf sites. Excavations have proved that Chanhu-daro and Lothal were the main centres for the bead-making industry as elaborate kilns for this purpose were found at these sites. Further, many unfinished beads and waste products have also been found at these sites. In Iran, Shahdad is the only site which has produced these etched cornelian beads in large numbers (personal examination). More than thirty of them were found by the writer in just a few trays shown to her; how many more there were no one seems to know, since the excavators could not give the exact figures. The beads are typically Harappan in shape, bearing typical Harappan designs. There is, therefore, no doubt that the Shahdad beads were of Harappan craftsmanship and, therefore, are likely to have been imported from some Harappan sites.

LAPIS LAZULI: Lapis lazuli was the most prized trade commodity in the third millennium B.C. It was widely distributed within and beyond the Harappan area. Beads made of this material have been found at Nal, Kulli, Mehi and Shahi Tump in Baluchistan. In the Greater Indus Valley, lapis has been located in the ruins of Rehman Dheri, Saraikhola II, Jalilpur II, Gumla, Amri, Pandiwahi, Jhukar, Mohenjo-daro, Chanhu-daro, Harappa and Balakot. It has also been unearthed at Kalibangan in Rajasthan, Lothal in Gujarat, Surkotada in Kutch, and Banawali in Haryana. However, objects of this stone have been found in limited quantity. Outside the Harappan culture-area, there are many sites in Mesopotamia and Iran which have beads of lapis lazuli in large quantities. Shahdad is one of the important sites where the graves have yielded beads of this precious stone in large numbers.

But what was the *modus operandi*? This issue has been dealt with by the authoress at some other place (Asthana 1979). Here it may suffice to point out that the available evidence forces us to conclude that the Shahdadians themselves did not control the mines at any time. First, if they were indeed controlling the mines and were export-merchants, they would not have used this export commodity in such large numbers in their graves since what is not in circulation is not an economic proposition. Secondly, if they were controlling the mines, they could have supplied the lapis lazuli to King Enmerker, the King of Uruk who, according to one text, had threatened the Lord of Aratta (a site identified with Shahdad), for obtaining lapis lazuli and cornelian. The Lord of Aratta agreed to the mutual exchange: cornelian for grain. What is most significant is the fact that he completely omitted the precious lapis lazuli; a fact which clearly shows that it was an export item with the Shahdadians. However, they themselves imported the raw material from some other trading agency which controlled the lapis mines of Badakshan: probably the Harappans or the Sokhtians at this point of time.

TURQUOISE: Turquoise was the most popular stone in the Middle East in the third and second millennia B.C., but it was used by the Harappans in limited quantities as only Mohenjo-daro, Rehman Dehri and Mehargarh have yielded beads of this stone. Soviet Central Asia (Kizil Kum) and Iran (Nishapur, Yazd) are known for their turquoise deposits. At present, it is difficult to locate the main source for this material. However, it appears that these beads in their finished form, may have come from Iran or Soviet Central Asia or both. The site of Shahdad has yielded a number of turquoise beads in the graves. Some of these have also come from the production-area. Perhaps, this indicates that the source for turquoise beads, found at Harappan sites, lies in Shahdad.

Metals

Copper, silver and lead were also extensively used by the Harappans, as most sites have produced copper objects in large numbers. However, copper is not a suitable subject for a study of trade pattern since a number of sources have been located in India and West Asia. In any case, on the basis of regional distribution, the Harappans of Sind and Punjab probably used the copper deposits of Baluchistan, Afghanistan and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Kirman; though the Khetri mines could have easily met the Rajasthan and Haryana requirements. In the Kirman region, copper metallurgy had a long tradition which goes back to 5000 B.C. at Tal-I-Iblis. This region is full of copper deposits. Shahdad has yielded a number of copper objects and the metal-production area of this site is quite extensive. It probably supplied copper objects or copper ingots to other cities; possibly to the Harappans also. But archaeology has yet to prove this as similar copper objects have not been found in Harappan areas so far. However, Lothal and Susa both have similar copper ingots. A copper mirror, **(fig. 39.2/2)** discovered at Shahdad, has attracted the attention of archaeologists (Hakimi 1972: pl. XXI C). It is a typical Indus type mirror which reached Shahdad through the normal trade routes. This is probably a product of the Baluchi area or Southern Bactria (at Dashly Tepe a similar mirror has been found).

The silver and lead in this region were the other attractions for the Harappans. Silver was used by the Harappans living in Sind and the Punjab but, in Gujarat and Rajasthan, it was rarely used. It appears that silver was easily available to only that part of the Harappan area, which was on the western side and hence closer to Iran. The most promising sources of silver, for Mohenjo-daro and Harappa, seem to be those in Afghanistan and Iran. Lead mines, a possible source of silver also, have been located between Nakhlak and Bayazeh, Anarak zone Khazakstan, Isphana, Kirman and in the Elburz Mountain. Silver mines are located in southern-eastern Iran at Kuh-i Nugre and between Fasa and Zahedan. In India, Rajasthan, Bihar and Orrisa contain silver-bearing lead ores but only in small quantities. Since Orissa and Bihar were far-off regions, and Ajmer and Jawar mines in Rajasthan are the likely sources for lead and silver, but we have no definite times. Distribution of objects made of these metals was more widespread in Sind and Punjab than inGujarat and Rajasthan. This may suggest that these metals were brought in from West Asia and not from Rajasthan. Afghani and Irani sources may both have been exploited. The Harappans may have traded with Shahdadians both for silver and lead.

CONCLUSION

After listing the main commodities possibly traded between the Shahdadians and the Harappans, the problem that arises concerns the mechanism of trade itself. Did the Harappans themselves go to Shahdad or were some middlemen involved?. This problem has been dealt elsewhere in detail (Asthana 1979: 55-60). Here suffice it to mention that both Kulli and Shahi Tump people were active and mobile in this part of Iran. They possibly worked on behalf of the Harappans, as typical Harappan pottery and seals are not available at Shahdad. On the basis of the concentration of grey ware, such as at Shahi Tump (Makran), and its limited occurrence at Shahdad, Tepe Yahya, Shahr-i Sokhta, Bampur, etc. in Iran, it can easily be visualized that the Shahi Tump people carried the goods to Shahdad and transacted business with Shahdadians as well as with the Mesopotamians (whose presence in the field of commerce seems evident from the discovery of a cylinder seal).

The total picture of the evidence given here convinces us that Shahdad was a big commercial town of the third millennium B.C. and that the Harappans also interacted with them, partly directly, partly indirectly.

REFERENCES

Asthana. S. 1979. Harappan Interest in Kirman. *Man & Environment*, Vol. 3; 55-60.

Caldwell, J.R. (ed) 1967. Investigation at Tal-i-Iblis. *Illinois State Museum Preleminary Reports*. No. 9. Springfield.

Hakimi, A. 1972. *Catalogue de l'exposition Lut Xabis* (Shahdad). Premier Symposium Annual de la recherche Archeologique en Iran, Tehran.

———. 1973. Prehistoric Discovery in East Iran. *Illustrated London News*. 64-66.

Kaboli, M.A. 1974. Shahdad in third Millennium B.C. *Proceedings of the IInd Annual Symposium on Archaeological Research in Iran 1973*.; 1-9.

Kohl, P. 1976. Steatite Carvings of the Early Third Millennium B.C. *American Journal of Archaeology*. Vol. 80, 1; 73-75.

Kramer, S.N. 1952. *Enmerker and the Lord of Aratta: A Sumerian Epic Tale of Iraq and Iran*. Philadelphia.

Lamberg-Karlovsky, C.C. and Tosi, M. 1973. Shahr-i Sokhta and Tepe Yahya: Tracts on the Earliest History on the Iranian Plateau. *East and West*. Vol. 23, 1.2; 21-53.

Marshall, J. 1931. *Mohenjo-daro and the Indus Civilization*. Vol. 2-3.

Salvatori, S. 1977. A Brief Surface Survey of Shahdad 1977. (unpublished).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

40

Elizabeth During Caspers

Sumerian Trading Communities Residing in Harappan Society

In 1977, Parpola, Parpola and Brunswig (1977: 129-165) drew attention to cuneiform records of the late third millennium B.C. which refer to people or 'sons' of Meluhha, who, as the authors stated, 'had undergone a process of acculturation into Mesopotamian society of Ur III times'. They also pointed to textual references, of Ur II date, relating to a Meluhha village, situated in the territory of the old city state of Lagash, thus surmising the existence of commercial enclaves in the sea and river ports of southern Mesopotamia. Additionally the same authors demonstrated, that Meluhhans already resided in Mesopotamia during Akkadian times. In contrast to the Ur III references, which relate to well-established 'new Sumerians' the Akkadian record, used by these authors , seems to witness the presence of what they call 'a first or second generation Meluhhan immigrant', bearing a name which appears to have been a direct transliteration from his native or Meluhhan language into Sumerian. The presence of Meluhhan ships docking at the city of Akkad, as mentioned in an inscription by Sargon, 2370 B.C., together with the reference to a man with an Akkadian name entitled, 'the holder of a Meluhha ship', which appears on a late Akkadian tablet and also the fact that a Sargonid cylinder seal bears the inscription *'Su-ilisu,* Meluhha interpreter' would seem fairly sufficient evidence to imply that, even from Akkadian times, Meluhha and Mesopotamia maintained a direct sea route via the Arabian Gulf.

In the present paper we will take, as a working model, the most generally accepted view , which correlates Meluhha with the Indus Civilization in its widest geographical and chronological sense. The testimony that the raw materials used for the varied artistic achievements in Early Dynastic times are similar to the ones known to have come from Meluhha during the Akkadian and Ur III periods, appears to hint at the proto-urban or formative phase of the Harappan culture. This is approximately datable to the early centuries of the third millennium B.C., for the earliest Indus–West Asian trade contacts,at which time they formed a minor component in the recently documented contemporary trade network of the Iranian Plateau and Mesopotamia.

Until recently it was generally felt that, although the Mesopotamian tests show clear and personal trade contact through both Dilmun and Magan at the entrance of the Arabian Gulf, reference to Sumerian fleets or Sumerian merchants actually departing from Mesopotamia directly for Meluhha were not proven, although Butz emphasizes, 'Es ist auffallig, dass wir in "Enki und Ninhursag" den EXPORT von Schiffen aus Ur nach Meluhha kennen (Butz 1979). It was also maintained, that archaeological finds on Indian territory failed to show conclusively, any evidence of direct trade contact, the more so as the few cylinder seals from India do not bear Mesopotamian patterns. All that could be said with absolute certainty was that the shape of the cylinder seal was attempted on rare occasions. Scholars of Indian archaeology have tended to emphasize the difference between the civilization of the Indus and that of Mesopotamia rather than stressing the importance of the links between the two. Since these equally important links have

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

been considered less obvious and thus recognized, perhaps they have not received the attention which they deserve.

The aim of this short paper is to show a situation very similar to that existing in Mesopotamia, may well pertain to the Indus Valley areas, despite the lack of textual support.

An unbiased study of a rather large group of what may be loosely termed 'sealing amulets', reported from the old excavations at Harappa, Mohenjo-daro and Chanhu-daro, appears to show definite non-Indus characteristics. This perhaps calls for a reappraisal of the cylinder seals from Mohenjo-daro and Kalibangan. This new approach to the Indus material currently under discussion would appear to indicate Sumerian integration into the multi-ethnic Harappan society, primarily through the impetus of mercantile interest. Perhaps initially ill-defined and insignificant, one might surely presume that the resultant Sumero-Indian descendants adapted completely to the confines of the Harappan social order, as conversely the offspring of the Harappan merchants achieved in the Mesopotamian sphere.

The most intrinsic difference in trading matters between Mesopotamia and the Indus Civilization is the use of the cylinder seal in the former cultural sphere of influence versus that of the stamp seal in the latter. Nevertheless, both implements have one basic trait in common and that is that they provide the written transactions and arrangements, as well as the commodities and bulk consignments with an authentic stamped guarantee by one or more of the trade-partners involved. Yet, whereas the stamp seal by dint of its very shape can only cover a limited area, the cylinder on the other hand can be rolled over any length and shape of a piece of clay. The device depicted on the stamp seal had to be adapted within the limited space of its obverse and is, therefore, hardly ever of a narrative nature but quite the reverse is generally true of the design on a cylinder seal, in which narrative potentiality and character are even more emphasized as the scene depicted is in principle infinitely repetitive. Without being categorical about it, one could even postulate that the cylinder seal was an ideal tool for sealing documents in clay, whereas the stamp seal was the implement *par excellence* to leave a firm imprint on a lump of clay for attachment to goods for official sealing and to guarantee the authenticity of the sender. The fact that the cylinder seal is inherent to the Mesopotamian cultural sphere of influence has, up to now, led us to recognize the occurrence of the few cylinders from Mohenjo-daro as an indication that the shape of the cylinder was at least experimented with during the time span of the Indus Civilization, without, however, considering the contingency of their presence in the Harappan cultural environment.

Taking the two basic characteristic elements of the cylinder seal, namely the cylindrical shape and the narrative concept, as a guide, the following objects will prove pertinent to our topic:

1.squattish, slender and miniature-shaped cylinder seals proper, made of stone, steatite, faience and perhaps shell and bearing Indus as well as non-Indus designs. As a rule they appear to be drilled, although in a few cases they have been left undrilled. One squat and drilled stone cylinder, discovered in the Harappan layer at Kalibangan Period II in Rajasthan, shows a deeply cut design with purely Indian subject-matter (Lal 1979, pl. Ia), which can be compared *151* with similar devices from Kalibangan itself and from Mohenjo-daro (Mackay 1938). Two holed *152* cylinder seals from Mohenjo-daro have less readily identifiable representations. One rather squattish steatite cylinder from the so-called 'lower levels' shows, in a technique only describable as 'deep drilled', a non-Indus device of two short-horned animals with birds above their backs, an erect and gigantic creature possibly a snake with prey in its mouth, and a small spiky tree in between the two quadrupeds (Mackay 1938, Plate Ic). The theme of animals with birds shown above their backs in a landscape, recall similar motifs on the Scarlet Ware for example from Khafajah and Tell Agrab in the Diyala region. Only the peculiarly erect 'spiky' tail of the animal on the right has its parallels among the representations on the square stamp seals, but no clear and definite comparisons with Mesopotamian glyptic art can be as yet suggested. The second cylinder seal comes from the so-called 'upper levels' at Mohenjo-daro and is more slenderly shaped and less sophisticated drilled calcite cylinder with rather worn details (Mackay 1938). It shows two *153* gazelles or antelopes, and an eight-legged creature, most likely an insect with pincers or antennae. The two-horned animals and their unusual placing are unparalleled in the Indus Valley re-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

pertoire (During Caspers 1976), but the possible insect can be compared, to some degree, with a centrally placed outsize insect with antennae on two very worn faience amulets (Mackay 1938: 357-358, pl. XCI, 13, 19a-19b). Some comparison can also be drawn between this creature and a similar insect portrayed on a single-sided terracotta amulet (Mackay 1938: 363, pl. CIII, 16). Both these are from Mohenjo-daro. The 'upper levels' at Mohenjo-daro also furnished a long and fairly slender cylinder, originally with a pale turquoise-blue glaze over a soft white paste and with irregularly crossed diagonal lines. Buchanan regarded this undrilled cylinder as probably being a bead, but this view seems untenable since one end bears a *swastika* device and the other, two or more indistinct Indus characters, both usable for impressions (Mackay 1938: 485, pl. XCVI 509). A fourth possible cylinder seal from the 'lower levels' at Mohenjo-daro consists only of a small portion made of steatite on which only one possible Indus sign is still discernible (Mackay 1938: 485, pl. XCVI. 509).

Up to date, only three cylinder seals have been reported from Harappa, all of which are made of white steatite (Vats 1940: 317, 327, pls. CXXXIV, q.R.S. XCV 409, 409a). The longest in shape is inscribed with two pictograms and shows a dotted circle at each end. The next one is a short, holed cylinder just under half a centimetre high and inscribed round the circumference. Vats remarks that it is the only example of its kind so far found. A similar small cylinder, but this time not holed and also referred to as the only example of its kind, is inscribed with Indus characters round its circumference and on the top, and bearing a dotted circle on the lower end. No reference to cylinder seals has come from Chanhu-daro and even 'sealing amulets' are significantly rare.

2. We come now to a second group of a limited number of sturdy, straight-sided 'mock' cylinder seals—in fact it may even be better to call them empty or unfinished cylinders—made of shell, measuring between 1.3 and 3 cm in height. One comes from Mohenjo-daro and five from Harappa. Three of them show a vertical hole due to the natural spiral-like formation of the shell itself, thus imitating an intentionally drilled perforation. *155* *156*

Since we have to take into consideration that shell is of a perishable nature, we may have to entertain that these 'imitation' shell cylinders, whether naturally holed or left unperforated, may well have occurred more frequently. In the context of our topic, it seems pertinent to recall that, in Early Dynastic (II-III) Sumer, the core of large shells was used in the manufacture of the sturdy cylinder seals; one of the many types and varieties abounding during that period. In Sargonid times, however, the use of the soft shell cores became rare and they were discontinued before the end of this period. Even wooden cylinder seals are known to have been of limited usage in ancient Sumer in Early Dynastic times. Taking into account the relationship between the Indus Valley Culture and Sumer in pre-Akkadian times, there can be no substantial objection to the hypothesis that this Mesopotamian practice may well have been transferred to ancient India when the first Sumerian traders started to settle down in the Indus Valley regions. The suitability of the Indian wood for seal-cutting remains, nevertheless, a matter for further investigation. The fact that at least three of the empty 'imitation' cylinders have no bore-hole, and this also pertains to the cylinder from Mohenjo-daro, regarded by Buchanan as probably being a bead, may well be another pointer in favour of an early, pre-Akkadian contact, since an axial perforation is not general amongst the earliest Mesopotamian cylinder seals.

3. This brings us to a third group of objects relevant to our topic and which appear in considerable numbers both at Harappa and Mohenjo-daro, though only once at Chanhu-daro (Mackay 1943: 149, pl. LII, 33, 33a). These consist of longish twisted and warped pieces of reddish clay and faience, the former sometimes with traces of a red to dark red slip, the latter originally with a bluish-yellow coating. They bear narrative scenes which can be readily recognized as rolled impressions, made by a type of clyinder seal. These longish pieces with their squarish diameter are twisted longitudinally, this being typical of the result of rolling a cylinder seal along more than one side of a probably ready-cut piece of wet clay or faience. The fact that to date no cylinder seals with comparable designs have been discovered in the Indus Valley, may well be due to the perishable nature of the cylinders. The fact that several of these twisted impressions, which I prefer to refer to as 'sealing amulets', bear the same narrative design does not in my opinion warrant *157* *158*

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

their being made in moulds, as suggested in the old excavation reports. Assuming that a mould has been usesd, it would be unlikey that these 'sealing amulets' were twisted and warped, although in principle, a mould could be considered for the occasional straight strips of clay with narrative impressions on one or more sides. It is also possible that the latter were formed by join-
159 ing two strips of clay back to back after the imprint was made.

The fourth group of relevant material is a large number of long cylindrical or oval-shaped 'sealing amulets', which occur primarily at Harappa with one example only from Mohenjo-daro. They share a common feature in that their moulds must have been made in two parts which, on being pressed together, formed a more or less distinct ridge at the point of juncture. These thin relief lines divide the narratives one from the other and sometimes the narrative from an accompanying script. Among these pottery and faience 'sealing amulets' certain groups of different denomination appear to be duplicated from one and the same mould. Though no such moulds have come to light to support this theory, it is always possible that they were formed of a less durable material such as wood, perhaps thin copper, or even, indeed, of clay. The usage of moulds was known to the Indus people, since it seems a fair supposition that open clay moulds were employed to produce the double-faced terracotta heads and the human
160 and feline masks from Mohenjo-daro. The actual
161 presence of an open mould at the latter site (personal communication) for the manufacture of a bull's head indicates a similar practice for possibly several of the more splendidly rendered terracotta animal heads. Contrarily, the bodies appear to have been modelled by hand.

These round or oval-shaped 'sealing amulets' have a far less narrative character than displayed in the scenery of the warped cylinder impres sions. They show a line of Indus script on one
162 side and in most cases one single representation of either a tree within a railing (Vats 1940: 317, 330, 331, pl. XCIII, 323,326, 328; XCIV, 332; XCIII,323, 325-328, XCIV, 329, 330-332' CI,
163 705-706) or a 'sacred brazier (Vats 1940; 317, 330-331, pls. XCII, 320, 321; LXXXIV; XCIII, 309, 320, 321; XCIV, 328)—both these patterns being typical for Harappa only—or a single
164 'unicorn' (Vats 1940; 317, 330-331, pl. XCIII, 315) or a horned human figure, etc. (Vats 1940: 317, 330, pl. XCIII, 307, 318, 319) on the other. 165
Can we perhaps assume that the shape of the cylinder seal *per se* was used as a prototype, but using a purely Indus Valley decorative device? Appearing to bear out this supposition, we have been able to demonstrate that the use of the cylinder was more frequent than had been previously recognized and also that the patterns used range from the purely Indian, through the Indianesque to the possibly Sumerian influenced.

The hollow clay or faience cylinders with relief designs, as well as the longish twisted and warped pieces of clay and faience showing cylinder impressions, have been subjected to frequent handling and rubbing since their surfaces are smoothed and worn and their narratives often blurred and indistinct. This together with the fact that they have no hole or boss for attachment lends itself to the supposition that they may have been carried or stitched in a case, a pouch or a comparable cloth or leather envelope, as an amulet, much as today in the case of amulets or good luck charms. They are often so erased by rubbing that decipherment is difficult and some pottery 'sealing amulets' have a semi-polished surface, as if constantly held in the fingers. It could perhaps be suggested that these 'sealing amulets' served a purpose similar to the so-called 'worry beads' of the Arabs today.

Being used as amulets of some sort, their direct practical function for mercantile purpose has possibly largely ceased to exist. However, at least one rectangular red-slipped (amulet) from Mohenjo-daro (Mackay 1938: 361-362, pl. CIII, 166
8-10), showing amongst other motifs, a large tree with a platform around it—the motif *par excellence* at Harappa—has on the reverse the deep impression from a mat, perhaps suggesting that at least some of the cylinders may have had a concurrent use for trading purpose.

Lack of space prevents us from discussing the intrinsic elements of the previously mentioned stone cylinders and these 'sealing amulets'. A cursory discussion can be found in the complete paper which will be published elsewhere (*AION* 1980-81). Here we can only point out that parallels as well as differences can be detected between the 'sealing amulets' from Harappa and Mohenjo-daro regarding overall designs, specific single motifs, their position on the available amulet surface and the frequency of occurrence

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of commonly shared patterns. Chanhu-daro can be disregarded in this respect, since this site furnished only one warped impression.

It suffices to enumerate the most salient pointers in favour of possible cultural and/or mercantile contacts within the proto-urban or formative phase of the Harappan Culture and early Sumer. One important suggestive correlation with pre-Sargonid Sumer is the hair-styling of the male Indus figurines portrayed on the square stamp seals, the stone cylinder seal from Kalibangan, the 'sealing amulets' and the stone and clay sculpture from the Indus Valley, the latter which
167 is found exclusively at Mohenjo-daro. In each
168 case, the hair is dressed in a bun, which is then secured horizontally by means of a ribbon or hairslide of some sort, resulting in the division of hair into two protuberancess one above the other. These Indian fashions most closely resemble those of the Early Dynastic III period, or at the very latest, those of early Akkadian times, e.g. the 'Stele of the Vultures' of King Eannatum of Umma, *c.* 2500 B.C., the statue of Lamgi-Mari, King of Mari, also to be dated to the first half of
169 the third millennium B.C. and the electrum wig-helmet of King Meskalamdug from the Royal Cemetery at Ur, possibly belonging to Early Dynastic III B. Should these be thought to be a positive link between the hairstyles of the Indus and those of Mesopotamia then, it seems fair to suggest that the transference of style occurred either during, or shortly after, the fashion was in vogue in Mesopotamia itself. This era coincides satisfactorily with the earliest proposed date for the etched cornelian beads from the Royal Cemetery at Ur, since it still seems to be generally accepted by Near Eastern archaeologists, to date the earliest imported cornelian beads from southern Mesopotamia to *c.* 2550 B.C., that is to say E D III B.

Another suggestive link with Western Asia is a composite ram-like animal sometimes with a human face and with long, undulating horns
170 shown by example on a 'sealing amulet' from Mohenjo-daro (Mackay 1938: 332, 388, pl. XCVIII, 606) and which is similar to the one included on the scenario seal from the lower levels
171 at the same site (Mackay 1938: 337, 382, pls. XCIV, 430; XCIX,A). It also occurs several times on ram and bovine-like representations on the copper platelets from Mohenjo-daro. The portrayal of the fore and aft fashion of the long, undulating horns of this ram-like creature is the same as the method of rendering the horns as protruding fore and aft seen from Protoliterate b,c and d in Mesopotamia, where the rendering 172
of horns of a more or less naturalistic stance began to be shown alongside the so-termed 'one-horned variety', which in reality is a superimposition of horns on cattle drawn in profile by the early Sumerian artists. For the moment it is only possible to make passing reference to the co-existence of the fore and aft horns of the ram-like creature in the Indus Valley and their appearance in the glyptic repertoire in late Protoliterate Mesopotamia.

Two triangular prism-shaped 'sealing amulets' come from Mohenjo-daro, one pottery and one 173
faience (Marshall 1931: 395, pls CXVI, 5, 8; 174
CXVIII, 9), both with identically impressed designs, made by either a mould or a cylinder seal. The scene which is of interest to us, although rather broken and badly applied, consists of a procession of four human beings moving from left to right. The second can be seen to hold a fragmentary pole or standard with what resembles a striated pennant or flag hanging from the top. The third figure holds what appears to be a plinth on a pole surmounted by a standing bovine figure, usually referred to as a 'unicorn' and the fourth person carries the bowl and pole sections of what seem to have been intended to represent a 'sacred brazier'. Cylinder seals of the Protoliterate b period in Mesopotamia occasionally show processions of figures carrying objects of a varied nature and this practice continues through the late Protoliterate c and d periods. A probable comparison affords a cylinder seal from Abu Hatab (Moortgat 1940: Pl. 6,33), dated to the Protoliterate d or Jamdat Nasr period, which shows a row of three humans, the first of which carries a long stick, the second a pole from the top of which is possibly a dependent flag or pennant, and a third figure holding a pole surmounted by a double 'gate-post' symbol from which falls a pennant or a hanging flag. In the subsequent Early Dynastic times this theme of processions of humans carrying sacred symbols seems to cease its existence. Thus, some of the subject matter of the various categories of 'sealing amulets' appears to hint at an early proto-urban contact betwen the Indus and Sumer. Despite the inherent suggestion neither the precise chronological implications nor the true nature of this

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

relationship can be properly assessed at this early stage of our investigations.

The discussed archaeological items demonstrate beyond any doubt that cylinder seals made of varied material must have been in use in at least four Indus Valley sites and that their occurrence has, therefore, been far more frequent than was previously assumed. Using the shape of the Mesopotamian prototype and to some extent also the material from which they were made as a guide, one could, without being categorical about it, suggest that all the cylinder seals proper found in the Indus Valley, could conceivably be placed within the Mesopotamian late Protoliterate—Early Dynastic II/III sequence. It should, once again, be stressed, that the possibilities of late Protoliterate—Early Dynastic connections between these two areas should not be underestimated, the more since there are, in existence, other indications implying the establishment of a mutual pre-Akkadian intercourse.

In spite of certain preferences for 'sealing amulets' of the twisted variety over the cylindrical or oval-shaped type or vice versa and of clear differences in subject matter or the frequency of occurrence of commonly shared narrative designs or motifs between Harappa and Mohenjo-daro, and even in spite of an apparent difference between Kalibangan, Harappa, Mohenjo-daro, and Chanhu-daro, judged only by the published cylinders and 'sealing amulets' and their stratigraphical context, it is neither possible at present to place the various categories mentioned against a chronological backdrop nor to build up an internal chronological framework. It could be argued that the round and oval-shaped 'sealing amulets' may in fact belong to a later cultural or chronological phase than the actual cylinder seals or their impressions as found at Kalibangan, Harappa and Mohenjo-daro, since they imitate the shape of the Sumerian prototype in a purely Indian version. Howeverr, if we grant Vats' statement a degree of validity in that the oval-shaped 'sealing amulets' bearing an 'incense burner' or 'sacred brazier', were discovered in the earliest levels VI and VII at Harappa, a stage when this cult object still appears to be disconnected with the later inseparable 'unicorn', then neither does this way of reasoning seem to lead to a satisfactory classification.

The presence at Mohenjo-daro of two small objects about 2-3 cm.in height, which represent a double-ringed 'gate-post', a symbol frequently portrayed in various media in Sumer from late Protoliterate to Early Dynastic and even Akkadian times, which were clearly meant to be used as proper amulets of the hanging variety, underlines once again the preference for amuletic or talismanic objects in the Indian cultural environment. In Sumer, on the contrary, neither cylinder seal impressions nor 'gate-post' representations were used in this talismanic manner. As such these two 'gate-post' representations with their purely amuletic purpose, combined with their derivation from a basic Sumerian concept, strengthen the functional as well as chronological position of the 'sealing amulets'. 175

The archaeological reports from Mohenjo-daro and Harappa seem to suggest the concentration of 'sealing amulets' with a specific representation in certain and defined quarters of the cities (Mackay 1938: 350-351; Vats 1940: 195). If these observations are, indeed, valid, although we have no modern stratigraphical evidence to fall back on, then we may perhaps have an indication for a definite distinction between differing social or ethnic groupings living as minority elements among the society of Mohenjo-daro and Harappa. This factor, if indeed accepted, would seem to single them out as either foreigners or at least as no proper Harappans in a strict sense. Thus, there seems to be a case for Sumerian 'enclaves', to use Parpola's terminology, in which Sumerians and/or their Sumero-Indian descendants lived together. To belabour the obvious, marriage contracts with the host country's women has throughout history, facilitated and accelerated acceptance of the settlers. This practice doubtless affected the Sumerian traders and merchants and their descendants, integrating them sufficiently into Harappan society to permit the use of local amulets or charms. Only the original shape of the sealing device and some of the subject-matter betray the source of inspiration.

The greater majority of the 'sealing amulets' of both varieties indicate that their primary use was as amulets, rather than as purely mercantile adjuncts. This practice was not apparently known in their original homeland, Mesopotamia. Additionally, the greater part of the subject-matter, and its treatment is inherent in the Indian mental make-up. As we have to allow for a certain lapse of time

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

for the acculturation process to have taken place, an early third millennium B.C. date seems a fair proposition for most of the otherwise stylistically and iconographically earlier Sumerian designs. The same appears plausible for the adaptation of the shape of the cylinder *per se*, though now cut with Indian or Indianized-Sumerian designs and also for the purely Indian imitation of the shape of the cylinder produced by double moulds, rendering them unsuitable for the original practical purpose. That on the whole, the devices on the 'sealing amulets' differ from those depicted on the proper stamp seals, appears to indicate clearly that we are already one or perhaps more steps removed from their original Sumerian prototypes. The same goes for the cylinder seal from Kalibangan; the squat, sturdy shape could conceivably be placed in either the Protoliterate c and d times or in the Early Dynastic period. However, the scene depicted belongs definitely to the Indus Valley repertoire and as such its date remains open to suggestions, but may, in any case, be regarded as pre-Akkadian.

If it be justfied to assume that Sumerians resided in Indus cities where they could act as agents, engaged in trading matters or other mercantile capacities, then one would expect to find the clearest indication of their presence in such centres where they, like their Meluhhan counterparts in Mesopotamia, could be engaged both in the transhipment of goods and merchandise up country to eventual destination in India itseslf, and concurrently able to take an active part in the export of Meluhhan products via the Gulf.

When the commercial sea-trade of the Arabian Gulf, which involved the coastal urban centres of Chanhu-daro, Lothal, Bhagatrav, and possibly Surkotada I A, actually commenced is still difficult to assess, but it is a logical supposition that these mercantile contacts must already have been a going concern, before the first actual datable Indus objects reached southern Mesopotamia, possibly before E D III B times.

One would, therefore, expect Chanhu-daro to be the first and foremost city to show abundant evidence for Sumerian residents or their descendants. In fact, the same would hold for Lothal (I-IV A). This commercial centre, however, does not provide any published evidence either of what we deduce as having happened at Harappa and Mohenjo-daro. Yet Lothal, like Chanhu-daro was apparently a centre for the manufacture of the etched cornelian beads. We have, therefore, for the moment, to conclude, that the more southerly situated urban centres, like Chanhu-daro, Surkotada IA and Lothal, which one would have visualized as being eminently favourable for the settlement of Sumerian immigrants, Indianized Sumerians or their Indo-Sumerian descendants, neither show in their material culture a distinguishable foreign component, nor provide any assistance for better understanding of the clearly visible West Asian traits witnessed at Mohenjo-daro, Harappa and Kalibangan.

One possibility for the absence of these West Asian traits in the coastal urban centres is that, if Sumerian merchants or Sumerian immigrants had settled down in these areas, they had undergone the same rapid adaptation and assimilation process as the Meluhhans in Mesopotamia, whose presence in the southern Indus delta at that time was no longer traceable in the archaeological material and for whom there is no textual support. One could also argue that the lack of textual evidence that the Mesopotamians or their ships actually sailed to the Indus area, does not militate against the possibility that by the time the commercial liaisons between East and West were fully concentrated on the sea-borne trade through the Arabian Gulf, the Meluhhan themselves had taken the initiative and monopolized their own end of these business transactions. A third consideration concerns the date as well as the nature of the Mesopotamian relationship as seen at Mohenjo-daro, Harappa and Kalibangan. According to the middle Mesopotamian chronology their overall date would certainly encompass the late Protoliterate d and the three Early Dynastic periods, in other words the late fourth and the first half of the third millennia B.C.

It would, thus, appear that the only evidence for tangible contact with ancient Sumer is furnished by the more northerly situated urban centres of the Indus Civilization, including Mohenjo-daro.

We can only explain the frequent occurrence of these late fourth to middle third millennium B.C. traces in the northern urban centres of the Indus Civilization by the actual presence of Sumerians, and the reason for their residence there in turn should, undoubtedly, be seen as connected with the pre-Akkadian lapis lazuli trade between Badakhshan in north-eastern

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Afghanistan and Mesopotamia. We may, in fact, have to consider that the late Protoliterate d and the subsequent Early Dynastic Mesopotamian urban societies received their lapis lazuli supplies primarily, if not exclusively via the overland caravan routes through Iran. Both Dales and Tosi point out a sudden disintegration and a collapse of the proto-urban centres in southern Turkmenia and the Helmand basin by *c.* 2500 B.C. This is then followed by the stage where formalized, professional long distance trading and/or exchange activities were being conducted between West Asia and Indus Valley Civilization. The overland conduct of traffic being disrupted, the major trade now flowed by the coastal and sea route, obviously using the Arabian Gulf (Dales 1976: 77).

The proposed Early Dynastic caravan route overland across northern Afghanistan, northern Iran and the Diyala Region of Mesopotamia, can now be supplemented by an overland connection to the Punjab. The proximity of Kalibangan and Harappa may prove to be indicative. The collapse of the Helmand Valley Civilization, encompassing Sistan and the Helmand Valley, by 2500 B.C. may well be intimately related to a concentration of the Indianized Sumerian traders at Mohenjo-daro, the main metropolis in the Indus delta. The favourably geographical and strategical situation of this latter centre and the possibility that the ancient shoreline was nearer to Mohenjo-daro than at present, may have made this site a more attractive proposition when the move from overland to maritime trade began to be realized.

REFERENCES

ANNALI, Instituto Orientale di Napoli, Italia, 1980-81.

Butz, K. 1979. Fernhandel Import Und Export nach Tilmun. *Orientalia Lovniensia Analecta* S. (State and Temple Economy in the Ancient Near East I). 361 ff.

Dales, G.F. 1976. Shifting Trade Patterns between the Iranian Plateau and the Indus Valley in the third millennium B.C. Paris: *Colloques Internationaux du centre National de la Recherche Scientifique,* No. 567 *Plateau Iranien et l' Asie Centrale des Origines a la conquete Islamique;* 77.

During Caspers, E.C.L. 1976. Cultural Concepts in the Arabian Gulf and to the Indian Ocean. Transmissions in the Third Millennium and their Significance. *Proceedings of the Seminar for Arabian Studies.* Vol. 6; 22-23.

Lal, B.B. 1979. Kalibangan and the Indus Civilization. In *Essays in Indian Protohistory.* D.P. Agrawal and Dilip K. Chakrabarti eds. New Delhi;66-97.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro.* 2 vols. Delhi.

———. 1943. *Chanhu-daro Excavations 1935-36.* American Oriental Series. Vol. 20; 149.

Marshall, Sir John. 1931. *Mohenjo-daro and the Indus Civilization.* 3 vols. London.

Moortgat, A. 1940. *Vorderasiatische Rollsiegel.* Berlin.

Parpola, S; Parpola, A. Brunswing, R.H. Jr. 1977. The Meluhha Village. Evidence of Acculturation of Harappan Traders in Late Third Millennium Mesopotamia? *Journal of the Economic and Social History of the Orient.* Vol. XX; part II; 129-165.

Thapar, B.K. 1975. Kalibangan: A Harappan Metropolis Beyond the Indus Valley. *Expedition.* Vol. 17, 2; 19-32.

Vats, M.S. 1940. *Excavations at Harappa.* 2 vols. Delhi.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

41

Cleuziou Serge

Oman Peninsula and its relations Eastward during Third Millennium

Half way between the urban civilizations of Greater Mesopotamia and the Indus Valley, the Oman Peninsula **(fig.41.1)** remained, for a long time, an archaeological vacuum. This situation is partly responsible for the inaccuracy of most of the discussion relating to the contacts between Sumer and Harappa, at least those discussions dealing with the location of *Dilmun, Makkan* and *Meluhha*. I do not intend to enter the quarrel again, but most of the arguments, used by various authors, although they are ingenious, were thoroughly meaningless due to the scarcity of archaeological data for the areas under consideration, and more especially for the Oman Peninsula, a very suitable candidate for Makkan.

While the first archaeological excavations in the area took place more than twenty years ago at Umm an-Nar (Thorvildsen 1962), giving a first support to the Oman/Makkan hypothesis (Bibby 1970 : 298), no coherent picture of the ancient cultures of the Oman Peninsula was traceable before these very last years (Frifelt 1975a). Although this picture is still incomplete and subject to discussion, it seems that excavations and archaeometrical research have now yielded enough data to end the dispute about the location of Makkan. Moreover, when studied for itself and not as a simple part of a discussion about Mesopotamian foreign trade, the Oman Peninsula very quickly appears a normal culture of the third millennium B.C., with particularities related to its environment, but also strongly interrelated to the surrounding world. I would like to introduce here, some new aspects of a recently discovered part of the past, with special emphasis on its relations with the Indian subcontinent.

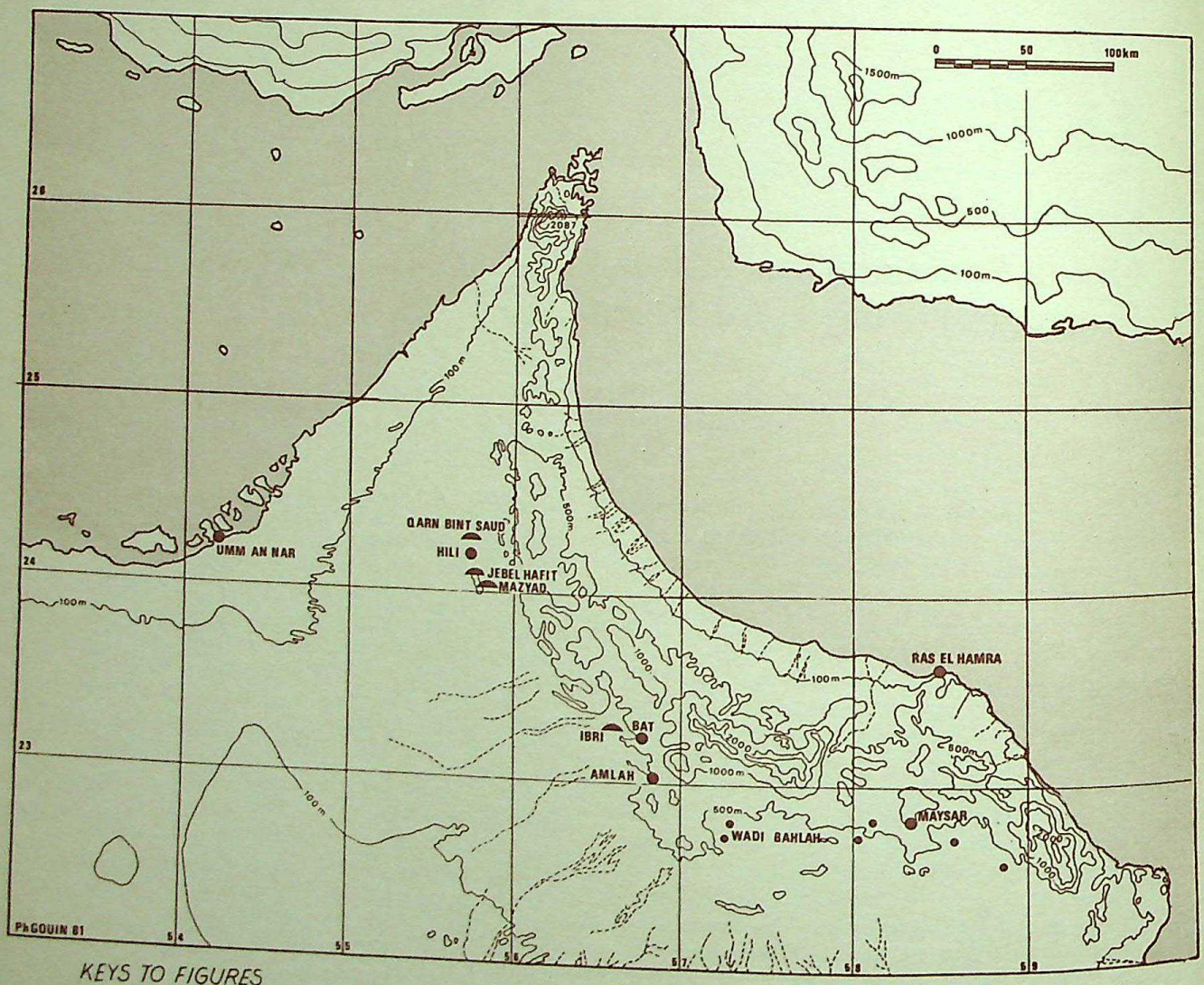
Four main phases can tentatively be defined between the end of the 4th millennium B.C. and the earliest part of the 2nd millennium B.C. This sequence is mainly the result of the work done in the oasis of al Ain by the Danish Archaeological Mission (Frifelt 1968, 1970, 1975a) and now continued by the French Archaeological Mission in Abu Dhabi. Further work has also occurred on the territory of the Sultanate of Oman, at Bat (Frifelt 1975b, 1976, 1979) and Maysar (Weisgerber 1980).

Various tentative periodizations of the protohistoric cultures of the Oman Peninsula have already been proposed (Humphries 1974, Tosi 1976), but I think that we have now enough information to propose a chronology based upon internal considerations rather than on broad comparison to the surrounding areas. Nonetheless, the sequence presented here is far from complete, and is only expected to be a good working frame for the next few years.

THE JEBEL HAFIT HORIZON

This period was defined by K. Frifelt (1970) upon the evidence of the material of the cairn graves carried out by the Danish archaeological team in the Jebel Hafit, south of al Ain **(fig.41.2)**. More documentation was provided one year later by E. During- Caspers (1971) who published the material of two amateur excavations in the same area. Since that time, additional information came through excavations of the Department of Antiquities of Abu Dhabi, of the Iraqi Archaeological

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



KEYS TO FIGURES
FIG 1 CAIRNS OF JEMDET NASR HORIZON
SITES OF 3RD MILLENIUM B.C.
(ONLY MAIN SITES ARE MAPPED)

Fig.41.1. Map of Oman peninsula

Mission to the United Arab Emirates and of the French Archaeological Mission (al Athar 1975 : 16-21; al Noeimi n.d.; Cleuziou and others 1978: 12-18). In the meantime, similar graves yielding similar material were excavated at Qarn Bint Sa'ud, north of al Ain (mostly unpublished) and near Ibri, in the Sultanate of Oman (Frifelt 1975b).

The main chronological evidence lies in a few painted jars of small size, with carinated body and shoulder, vertical neck and everted bevelled rim. The whole body is painted red with a cream band bearing black painted geometric or vegetal panels, on the upper part of the vessel. Such vessels are very similar to Mesopotamian examples of the Jemdet Nasr period in the Diyala (Delougaz 1952, pl. 36 c,d) or at Uruk (Strommenger 1963, pl. 35)[2]. Later comparisons with vessels of Shahr-i Sokhta have been proposed by M. Tosi (1976 : 90), in an attempt to lower the dates of these graves, but they look less convincing and a low date for the Jebel Hafit graves is no more necessary, according to the early 3rd millennium evidence reviewed below. It seems that there are no more problems for dating the Jebel Hafit graves to the Jemdet Nasr period, except the date of the Jemdet Nasr period itself[3].

As a matter of fact, painted jars are not that abundant and, until further information comes out, they seem restricted to the northern part of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

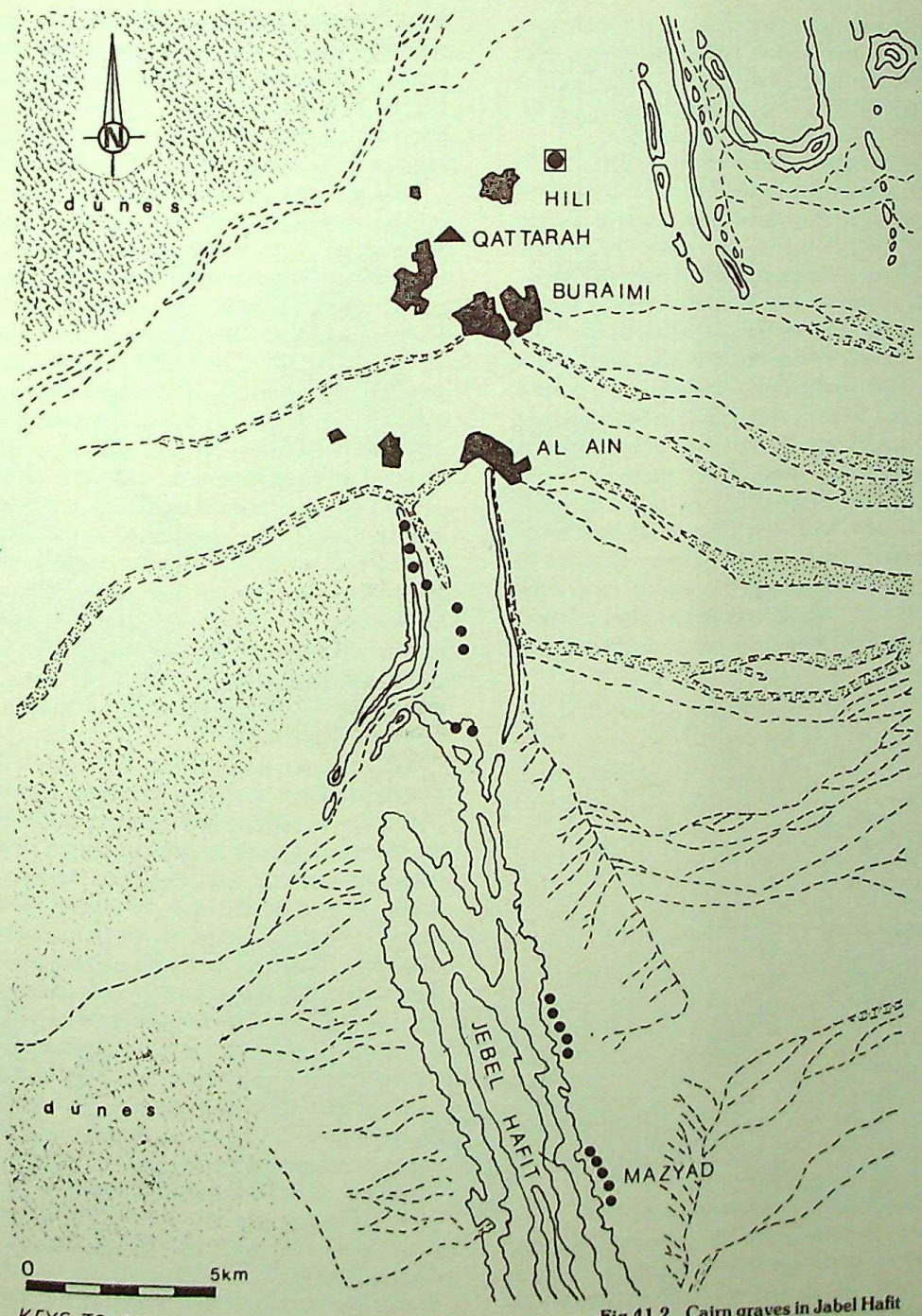


Fig.41.2. Cairn graves in Jabel Hafit

the Jebel Hafit. The other groups of graves at Mazyad on the eastern foothills of the Jebel Hafit (Frifelt 1957b)[4], at Qarn Bint Sa'ud and at Ibri, yielded only undecorated pots of the same shape.

Despite several surveys, no settlement related to that period has been found so far in the al Ain

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

area. Our only information comes from tombs and, as these tombs were widely plundered later and sometimes re-used during the 2nd (Cleuziou and others 1978 : 18) and 1st millennium (Frifelt 1970 : 380-81), our data are rather poor.

The graves are usually located by the foothills or on the summit of rocky outcrops. They have been frequently described (see more especially Frifelt 1975a,b ; Cleuziou and others 1978), and one may just mention again that they are single-chambered cairn graves with an entrance always facing south. They are usually made of two concentric ringwalls of unshaped stones, and appear to have been vaulted with corbelling dry stones. As far as can be seen, they contained remains of a few individuals **(fig. 41.3)**, never more than four or five, probably in a flexed position (Frifelt 1975a, fig. 9). Proper deposit of items could never be observed safely, and it cannot be determined if these were contemporaneous or successive burials, though the latter is most commonly assumed by archaeologists who consider these graves to be nuclear family burials (Frifelt 1975b : 67).

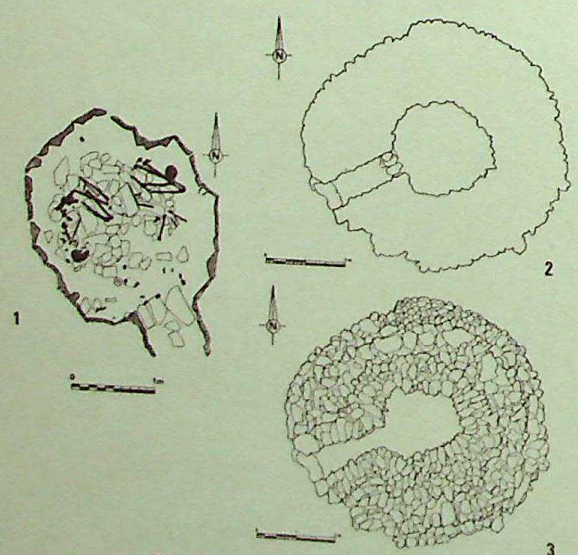


Fig.41.3. Plan of Cairn grave

Besides pottery, grave furniture included copper objects, of which only pins (Frifelt 1970 fig. 12b, c, fig. 22 d, e; Frifelt 1975b fig. 5 A,B; Cleuziou and others 1978: 20) and rivets (Frifelt 1975b fig. 5c; Cleuziou and others 1978: 20) were found. Beads were very common, including several kinds of shell beads, both from the Gulf and Oman Sea coast, various stones (including haematite and cornelian), bone and green glazed fritte. Square spacers of soft stone (Cleuziou and others 1978 fig. 17 n. 6) are similar to items found at Khafadje (Frankfort 1936: 49) or Susa 15 and 14A (Le Brun 1971 fig. 70 n. 2, 4), something which also relates the graves to the Jemdet Nasr or Early Dynastic I periods in Mesopotamia.

Although the evidence is scarce, the chronological situation and the links to Greater Mesopotamia are almost clear. The Jebel Hafit cairn graves broadly fall into the range of the so-called 'Proto-Elamite' influences on the Iranian Plateau, as known for instance from Godin Tepe V, Tepe Yahya IV C or Shahr-i Sokhta I. It is clear that the understanding of this period in the Oman Peninsula is linked to the understanding of the 'Jemdet Nasr/Proto-Elamite' period as a whole. Both Lamberg-Karlovsky (1973) and Potts (1977) have suggested exchange relations as an explanation for the occurrence of these potteries in the area of al Ain. Traded items could have been various stones like diorite, haematite, jasper, etc. or copper, although the latter does not seem to have reached Mesopotamia before Early Dynastic (abbrv. ED) II or even ED III (Berthoud 1979, Berthoud and Cleuziou, forthcoming). **(fig. 41.4).**

Till now we have faced a complete lack of direct evidence for such relations. But the fact that material related to Mesopotamia is frequently found in graves implies at least some social meaning besides this supposed exchange network. It is doubtful that all graves containing Jemdet Nasr-like material could have been the graves of Sumerian or Proto-Elamite tradesmen. This would mean that local people were buried in the cairn graves with foreign or imitated pottery. In other words, the natives adopted under the influence of newcomers a new type of item (pottery) to put into their graves. This assumption supposes a rather drastic acculturation. However, more insight in this matter would require at least some knowledge of these native people, which is completely missing now. No settlement or graves were found which could be related to a period earlier than the Jemdet Nasr horizon of the Jebel Hafit. The restricted extension of this horizon in the Peninsula is also an argument in favour of a quite localized influence of a foreign culture in the area. Broadly speaking, the only thing we can say is that foreign tradesmen encountered people to deal with in the al Ain area, and that they influenced these people.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

The only information available comes from the fishing and shell-gathering settlement of Ras el-Hamra, on the Arabian Sea coast, near Muscat (Tosi 1977). Not surprisingly, the site yielded no pottery. Environmental studies clearly demonstrated that commodities used on the site were to be found within a radius of a few miles around the settlement itself. This included copper pins and needles, showing at least that the use of copper was in no way related to the contacts with Mesopotamia. It is clear that one should not overemphasize the importance of the Jemdet Nasr relations and dismiss that of local settlers, simply because our evidence is biased.

THE EARLY THIRD MILLENNIUM

Presently, our only evidence for that period comes from a settlement site (Hili 8) and, if I am correct in my interpretation, from the beehive graves of Bat. The possibility that these graves could be a chronological link between the Jebel

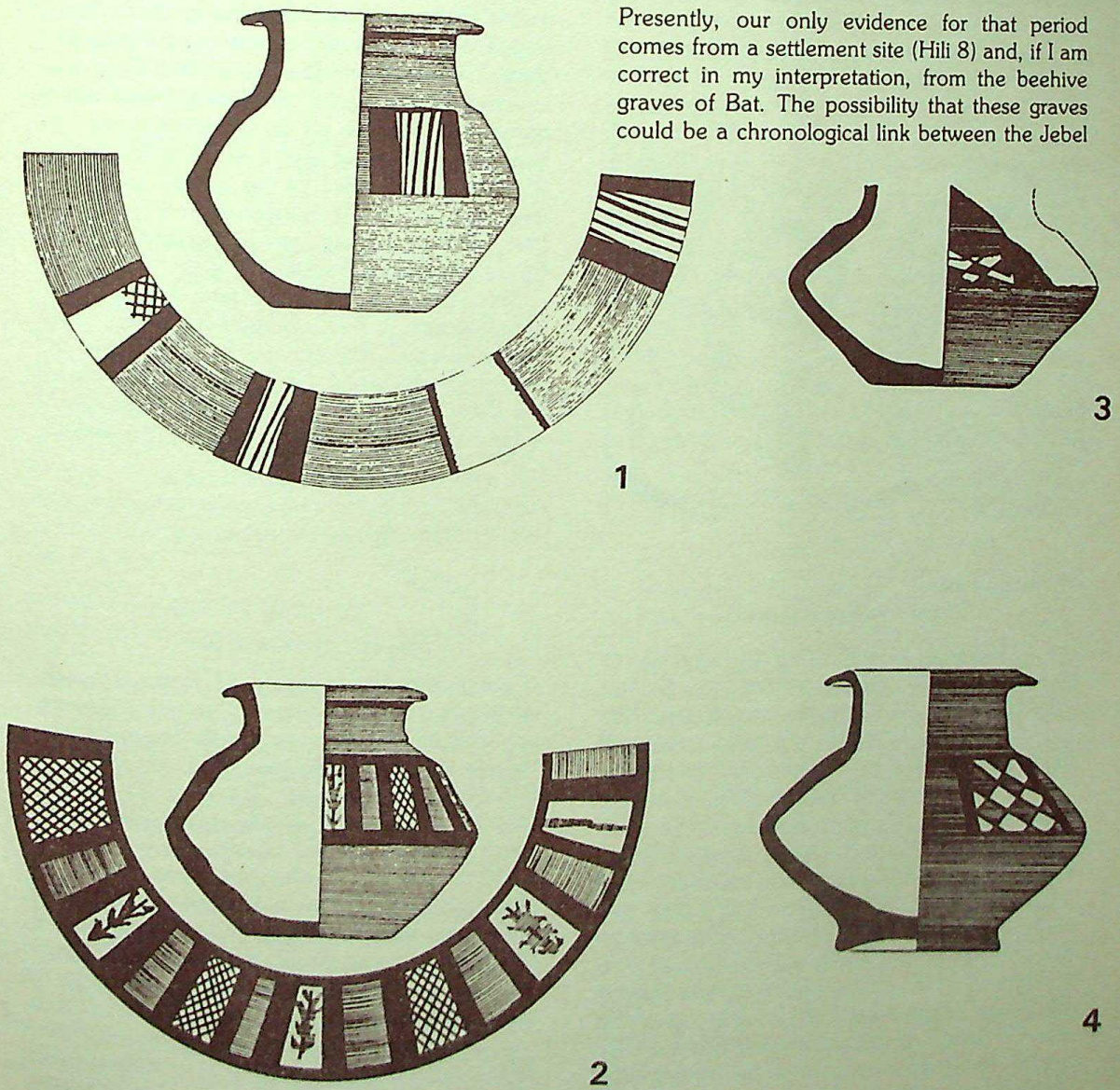


Fig.41.4. Painted pottery from Ain

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Hafit cairn graves and the classical 'Umm an-Nar' collective burials of the later period was pointed out some years ago by K. Frifelt, who considered them a transitional type between the above mentioned monuments (1975b).

At Hili 8, one of the several small mounds forming the 3rd millennium B.C. settlement at Hili, in the northern part of the al Ain oasis, the works of the French Archaeological Mission brought to light the only archaeological sequence known for the Oman Peninsula.

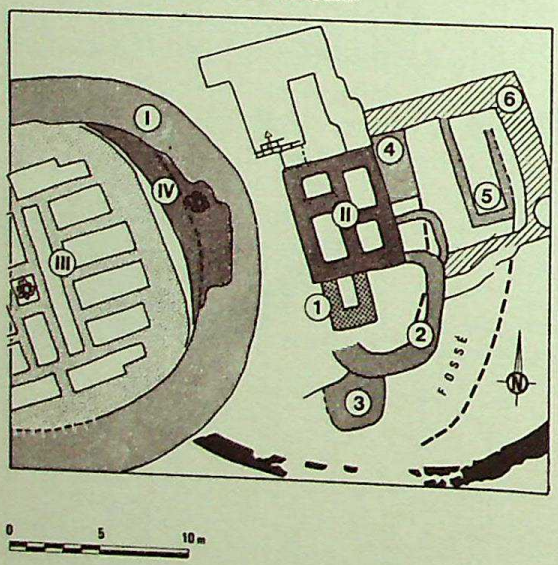


Fig.41.5.Structures at Hili 8

A square mud-brick building **(fig. 41.5 no. 1)** had already been dated to *ca.* 3000 B.C. by ^{14}C 177 (Cleuziou 1980a, b)[5]. This Building (building III) was 19 m inside, with a 1.5 m thick outer wall **(fig. 41.5)** made of large rectangular mud-bricks (*ca.* 55 × 30 × 8 cm). The inner space was divided into 16 rooms by smaller walls. The excavation showed that these rooms were filled with sand and gravel at the same time that the dividing walls were built. In the centre was a well. The building can therefore be interpreted as the solid base of a tower, with living quarters upstairs. This is not new: all the towers previously excavated in the Oman Peninsula and discussed below appear to have been built in the same way (Frifelt 1975a, 1976). One may even add that the dividing walls buried into the filling provided a good foundation for the walls of the living quarters, whose plan was probably rather similar to the ground plan recovered when excavating the basement.

This building was later extended, at least on its eastern side, the only one already known. These extensions, built with the same rectangular flat mud-bricks, were cut by the buildings of the later phases and their interpretation remains unclear. Of special interest is a structure abutting the north-eastern corner. It consists of several 'boxes' delimited by narrow walls, only 30 cm wide (one breadth of a mud-brick). The lowest part of these boxes was filled by patches of mud mixed with straw, which were very clearly unshaped mud-bricks. The top of this filling was covered with a whitish mud-plaster into which numerous imprints of grains were found. Its surface was burnt, at least in some places. As this structure was levelled by the construction of the later Building IV, its interpretation is not completely ascertained, but I would suggest that it may 178 have been a storage system for grain.

Archaeological items are rare, but we were lucky enough to find a dump-area related to the earlier building. Pottery was rare, far below the amount recovered in any other part of the site for the same amount of excavated earth. However, if a bowl **(fig. 41.6)** is rather atypical, the remains

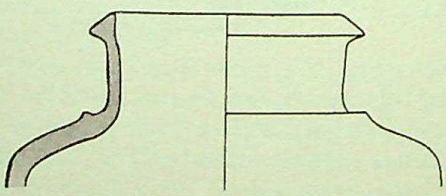


Fig.41.6. Hili 8: A jar bowl

of a high shouldered jar **(fig. 41.7)** with a triangular ridge on the shoulder, vertical neck and bevelled everted rim strongly recalls Mesopotamian vessels of ED I (Delougaz 1952, pl. 192 n. D 515-370, from Khafadje). This again is a link with Mesopotamia, which broadly agrees with the ^{14}C dates obtained for the contemporary building : 3110 ± 160 B.C. [5]. The dump was also full of stones, but a few of them were proper tools. Flint was rather abundant. Other materials included a few lumps of copper and several modelled pieces 179 of clay, some of them bearing imprints of basketry or rope.

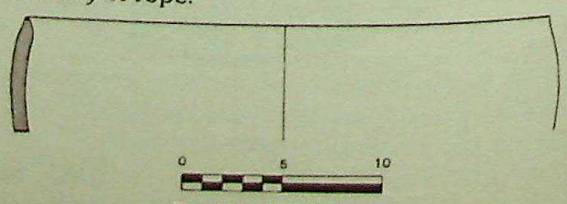


Fig.41.7. Hili 8: A jar

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Paleoecological material was abundant too. It still has to be studied and no proper account can be made here [6]. Bones, mainly of *ovis/capra*, but also some larger animals were found in great number. There were few shells, including mother-of-pearl and fragments of large cowries. Most interesting are the charred botanical remains, which included several dozens date kernels, cereals (wheat and barley) and *zizyphus*. It is now clearly demonstrated that agricultural economy existed in Oman as early as 3000 B.C., and possibly earlier.

One must probably agree that the graves at that time were of the 'beehive' type found at Bat and Ibri by K. Frifelt who considered them a transitional type (1975b : 69). She emphasized the fact that burial chambers were wider than in the previous period, sometimes divided into two rooms by an inner wall. A plinth was running along the outer wall, in the same fashion as evidenced from Umm an-Nar type graves (Frifelt 1975b figs. 1, 2, 21, 23). Funerary rites were not evidenced by the excavations. The pottery seems to continue the earlier 'Jemdet Nasr' wares (Frifelt 1975b fig. 12) but may also announce the later 3rd millennium pottery, with the appearance of black lines painted on buff ware (Frifelt 1975b fig. 11A,B).

Beehive graves are found near Hili. There are dozens of them on the top of the Jebel Haqlah, 2 km east of the site. These monuments have never been excavated and we have no elements to sustain a date in the early 3rd millennium. The ruins
180 of one of them, *ca.* 10 m in diameter, show quite clear evidence of a dividing wall. I would tentatively suggest that these graves are the cemetery of the Hili settlement in the early 3rd millennium B.C..

During this period, there is almost no evidence of relations between the Oman Peninsula and the countries located north (eastern Iran) and east of it (Baluchistan, Indus Valley). The main foreign relations are still with Mesopotamia. As this evidence is scarce (a few potsherds), one may even imagine that it is only a continuation of the Jemdet Nasr impact, and that Omani people continuing to produce a pottery related in some way to the earlier Jemdet Nasr models. However, the architectural evidence in the beginning of the following period certainly prevents this assumption.

THE MIDDLE AND LATE 3RD MILLENNIUM

This certainly is the best documented period all over the Peninsula. Major sites are Umm an-Nar (Thorvildsen 1962, Frifelt 1975a, 1979), Hili (Frifelt 1968, 1975a, Cleuziou 1980a,b, Cleuziou and others 1978). Although such a long time span is certainly to be further divided into several periods, this is presently impossible. Several attempts were made to build up a chronology from the surface collections gathered by the Harvard expedition to the Sultanate of Oman, by means of comparisons with the pottery sequences of Bampur, Tepe Yahya or Shahr-i Sokhta (Humpries 1974, Tosi 1976), but this remained very tentative and could never be matched by the excavations; no site ever yielded a proper stratigraphy.

At Hili 8, we only know, so far, one architectural sequence to which we can only occasionally relate potsherds, for most of the finds come from fillings where they are highly mixed. I would like to review that sequence and its significance for the oasis sites of the interior, before studying the coastal settlement at Umm an-Nar and then the funerary customs which give cultural unity to the Peninsula during this period.

THE OASES OF THE INTERIOR

A Tentative Chronology at Hili 8: The Architectural Sequence

At Hili 8, a certain continuity is obvious throughout the architectural sequence. The same buildings made of plano-convex mud-bricks were continuously in use, and the same collective burials seem to characterize the whole period. But there are clear changes too. The introduction of the plano-convex mud-bricks at the beginning of the period can be related to Early Dynastic II in Mesopotamia, and this emphasizes the still strong ties between the Oman Peninsula and that country. But at the end of the period, plano-convex mud-bricks are still in use (while no longer in use in Mesopotamia) and the pottery is strongly related to south-eastern Iran. Unfortunately, these changes cannot be traced throughout the sequence.

THE ARCHITECTURAL SEQUENCE

At a period roughly contemporaneous with ED II in Mesopotamia, the round building is destroyed and a new building is erected on its ruins. It is

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

round, *ca:* 25 m in diameter, and made of large plano-convex mud-bricks (50 × 30 × 12 cm). Only the outer curtain wall has survived. Curiously, the well is no longer a central one, but is located in the brickwork of that outer wall, so far a unique case all over the Oman Peninsula. At the same time, a smaller rectangular building (Building II) is erected on the eastern side. This building lies on a one metre-high stone basement, which includes some of the nicely shaped stones used in the facing of the graves (see below). Buildings II and IV are surrounded by a moat. Building II is later extended to the south (ext. 1 on **fig. 41.5**).

The second architectural phase is marked by the construction of a terrace south of building II (ext. 2 on **fig. 41.5**). The terrace wall, with its lower part made of stones, is founded in the already partly filled ditch, in front of its inner slope. East of Building II, one or two small rooms are built inside the ditch (ext. 5 on **fig. 41.5**), using the outer slope as a wall. The southern terrace wall is later reinforced (ext. 3 on **fig. 41.5**).

The third architectural phase includes a new terrace (ext. 6 on **fig. 41.5**), built on the levelled ext 5. This terrace was occupied by several kilns and fireplaces, one of them at least being related to copperwork. Two ^{14}C dates were obtained: 2450 ± 150 and 2400 ± 150 B.C South of Building II, terrace 2 and ext. 3 are destroyed, the ditch is completely filled in and the ground is now gently sloping southwards. Several kilns of unknown use were recovered there. To the west, round building IV is destroyed to its foundations, probably intentionally, and the area also seems to have been occupied by craft activities.

During the last architectural phase, a new round building (Building I) is erected on top of the ruins of Building IV. It is made of plano-convex mud-bricks, but rather smaller and of a rather different shape than those of Building IV. It was at best preserved on two courses of mud-bricks, and all the internal structure has vanished. The rectangular Building II seems to be partly destroyed and may survive as a low rectangular platform. The whole eastern area is occupied by kilns and fireplaces, one of them being clearly a coppersmith's kiln, as evidenced by pieces of furnace wall, possible fragments of crucibles and slags. Two ^{14}C dates, 2225±135 and 2200±110 B.C. were obtained from this area [8]. There is some evidence that Building I was later extended to the north, but this lies just below the surface and is severely eroded

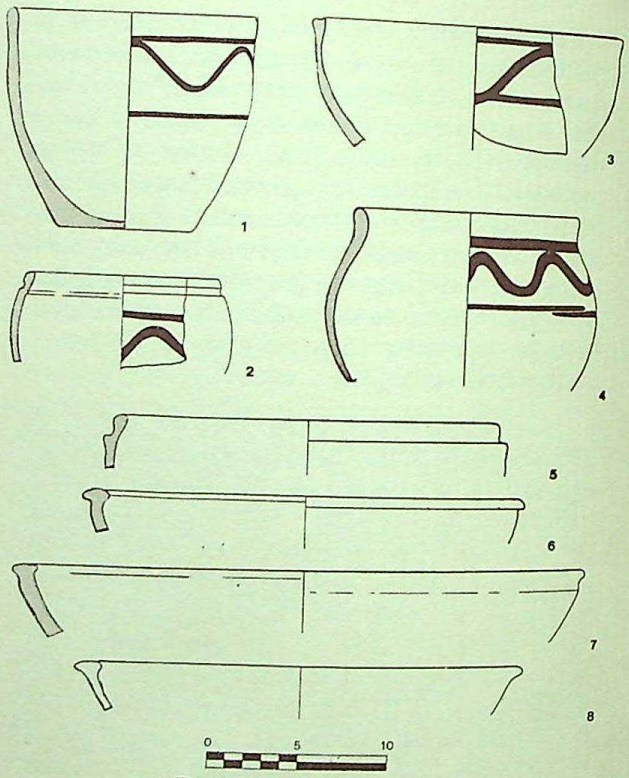


Fig.41.8. Hili 8: Pottery

THE POTTERY SEQUENCE: As it has alredy been said, it is very difficult to match the evolution of pottery with the architectural sequence. This evolution may be summarized as follows.

We have no pottery associated with the first architectural phase. We cannot therefore decide if the pottery during that phase was still related to Mesopotamia, as in the previous period, or if it was already of the painted kind evidenced later.

The second phase provided a few safely stratified shards **(fig. 41.8-10)**. They are already of the rather fine, sandy tempered ware, buff to orange in shade, which is predominant in the later phases. Painted decoration in black or dark brown is rather monotonous and mainly consists of one or two wavy lines on the shoulder of the vessels. Main shapes are bowls, globular pots with everted rim, and jars with a short everted neck. Jars with an everted neck and a carinated shoulder seem to be restricted to that period **(fig. 41.9 n. 1, 2, 5,)**, as well as small triangular meandering ridges on the shoulder of small jars **(fig. 41.10 n. 6,7,)**, large bowls with a flat thickened rim **(fig. 41.8 n. 6-8)** and large vessels

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

with an everted rim **(fig. 41.9 n. 7)**. Big jars with a meandering ridge on the shoulder, vertically pierced lugs on the ridge and painted decoration of hatched lenticular patterns on both sides of the ridge may be mainly related to that period **(fig. 41.10 n. 1, 3, 6, 7,)**. This is not absolutely safe, as numerous potsherds of the same kind occur in later contexts, but usually as loose shards.

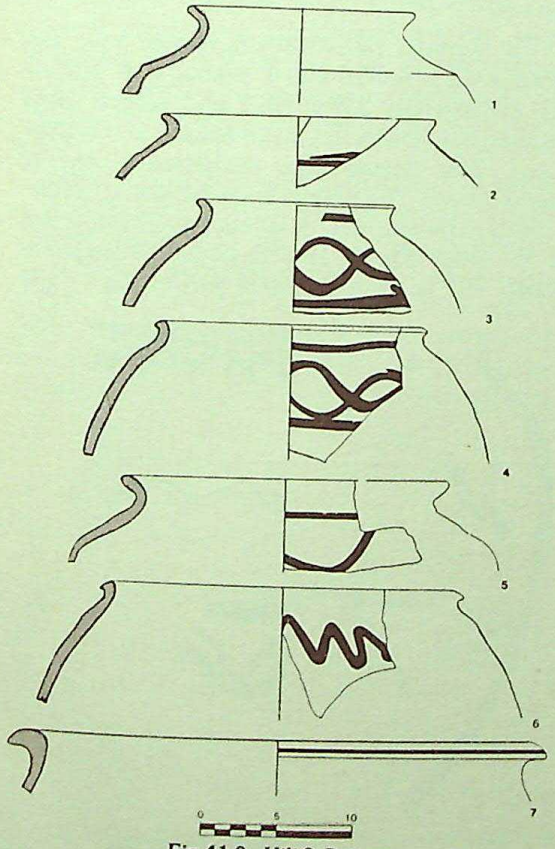


Fig.41.9. Hili 8: Pottery

This assemblage continues throughout the two subsequent architectural phases, while some evolution is already rather clear. For instance, spiral decoration, present during the 2nd and 3rd phases **(fig. 41.10 n. 5,8, fig. 41.11 n. 9-11)** is absent during the last one, which seems in turn characterized by double wavy lines painted right under the neck of the jars **(fig. 41.12)** and by a more frequent use of a red to brown slip, which however already appears during the 3rd phase. The last phase is also characterized by the abundance of bowls with a sharply grooved rim outside **(fig. 41.13 n. 6-8 and 9-12)**, a feature found all over the sequence **(fig. 41.8 n. 2,5)** but never in such quantities.

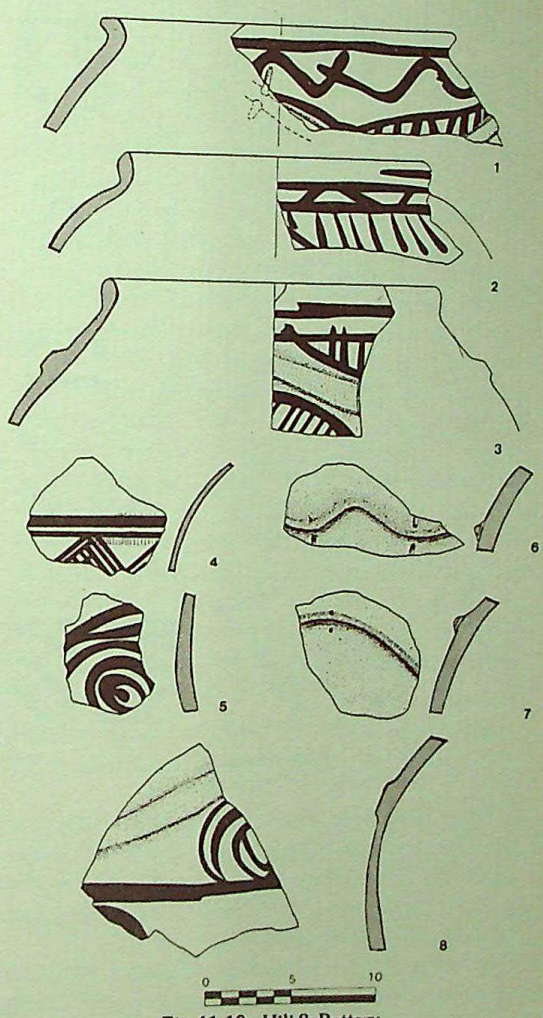


Fig.41.10. Hili 8: Pottery

One may also notice that the fine funerary wares (see below) are very rare on the settlement — a few dozens only among more than 10,000 potsherds — but are present at least since the second architectural phase **(fig. 41.10 n. 4)**.

Settlement Organization and Way of Life

As it appears from the architectural sequence, round towers with a solid lower part are a recurrent feature on the site. At Hili, another round tower had already been excavated by K. Frifelt (1968, 1975a), 300 metres north-east of our excavation (Hili 1 on **fig. 41.14**). It was made of plano-convex mud-bricks and provided with a central well **(fig. 41.15 n. 3)**. The inner structure shows a symmetrical organization on both sides or a central row of small rooms. The whole build-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

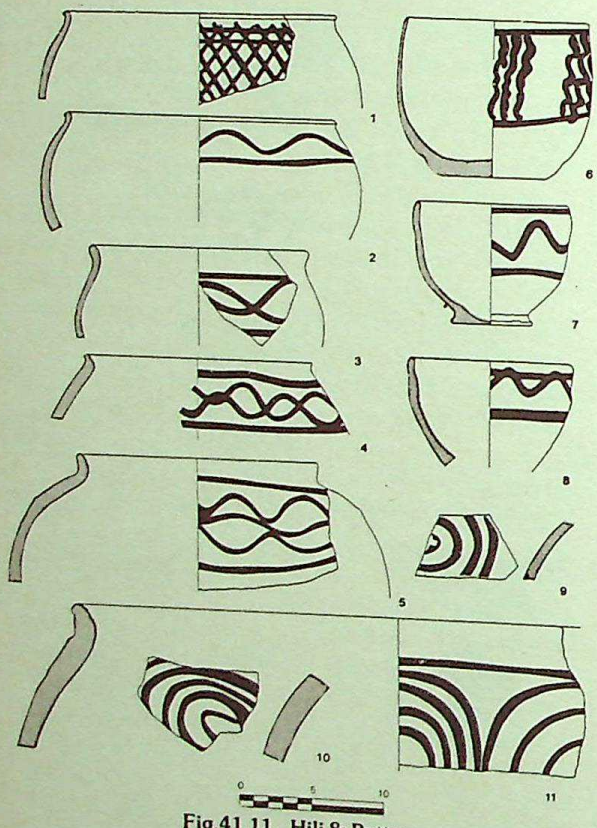


Fig.41.11. Hili 8: Pottery

ing had been from the beginning, filled with hard packed sand and gravel. According to the shape of mud-bricks (Frifelt 1975a fig. 53) and to the pottery found, it is to be dated to the second part of the third millennium B.C.

No other site has so far yielded such a complete sequence, but the excavations at Bat and Maysar add very useful informations on the settlement organization and the way of life.

At Bat, a round tower with a central well **(fig. 41.15 n. 2)** has ben excavated by K. Frifelt (1976, 1979). It was made of stones and the circular plan was obtained by recesses on the outer curtain wall. The inner structure presents the usual arrangement with two symmetrical sets of rooms on both sides of a central row which includes the wall. All rooms were filled with stones, and the preserved remains can be considered a solid basement. At its maximum height, it is five metre higher than the surrounding ground level, a fact which gives a good idea of the monumental aspect of these towers. A ^{14}C date of 2750 B.C. has been obtained for the construction of that building (Frifelt 1979: 584) 9, that is roughly contemporaneous with the construction of the first round tower at Hili 8.

Smaller buildings were found around the tower. The pottery was rather similar to that of Hili, and the presence of a spiral decoration recalls the two middle sub-phases of our architectural sequnece (Frifelt 1976 fig. 8). On a slope located one hundred metre away, a small test trench yielded evidence of houses with a similar pottery.

The German excavations at Maysar have also uncovered a tower with a central well: Maysar 25 (Weisgerber 1980: 95), and several large rectangular houses on a site related to a copper mine. Two phases were evidenced in one of these houses. The pottery is similar to that of Hili.

Round towers built of stones have been found in the Wadi Samad at al-Khashbah (Weisgerber 1980: 99), in the wadi Bahla on sites BB 19 and

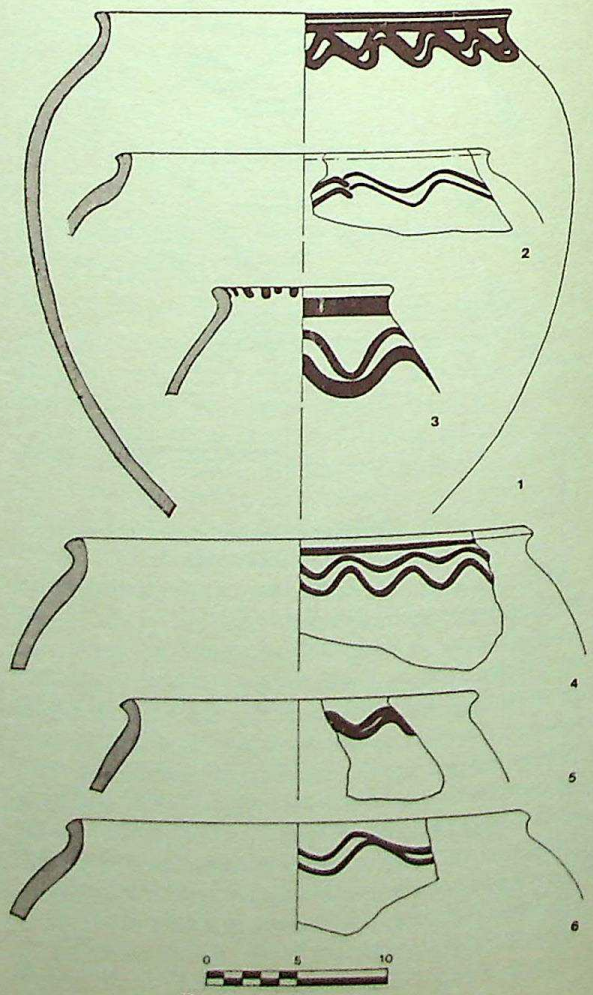


Fig.41.12. Hili 8: Pottery

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

BB 22 (Humphries and others 1975, fig. 7,8 and plate 2), at Amlah (de Cardi and others 1976: 102-114), near Salut in the Wadi Sayfan (de Cardi and others 1976: 163-4), at Firq and Rawdah (de Cardi and others: 159-61) and at several other places.

Bio-Cultural Data: Little bio-archaeological material has been analyzed in the Oman Peninsula. Animal husbandry, at least sheep and goat, is clear since their bones are the most numerous at Hili 8. Gazelle may still be hunted, and the question of camel domestication is still pending one (Compagnoni and Tosi 1978, Hoch 1979).

Agriculture is now well documented at Hili 8. L. Costantini had been able to identify various cereals (wheat, two row barley, oats, sorghum), most of them being present since the earlier occupation. The palm tree was also known as early as 3000 B.C. The first analysis of these remains can be read in Cleuziou and Costantini (1981), but they are still under study and more work is necessary to tell the whole meaning of these results. It is, however, clear that the communities of inner Oman could rely on a developed agriculture for their daily subsistence.

Crafts include stone tools, basketry and copper works. The latter was clearly evidenced at Hili (Berthoud and Cleuziou, forthcoming) and Bat (Frifelt 1979: 524), but the most exciting traces of this activity are certainly those of Maysar, were kilns (Weisgerber 1980 fig. 47. 50), stone tools and copper ingots (Weisgerber 1980 figs. 74,75) had been discovered among the houses related to a third millennium copper mine. Copper objects themselves are rarely found on the sites: pins at Hili 8 and Maysar, a copper chisel at Maysar (Weisgerber 1980 fig. 78 n. 5)

From Maysar comes the only seal so far found in the Oman Peninsula. This steatite object is triangular in section and bears on three sides engraved animals: caprids, zebu and scorpion, dog and caprid (Weisgerber 1980 fig.77). The style seems rather local and this piece cannot easily be compared with other known glyptic in the Near East.

Settlement Organization: Hili, Bat and Maysar have yielded good evidence for the organization

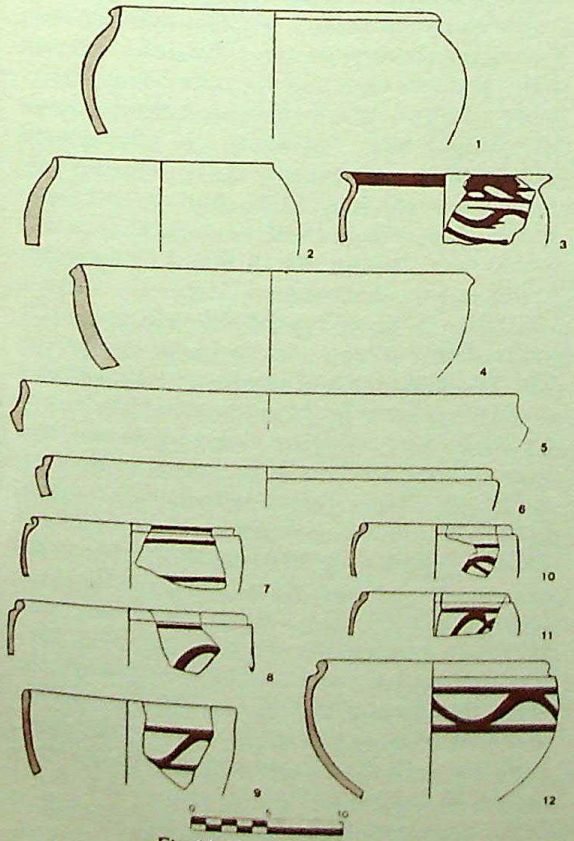


Fig.41.13. Hili 8: Pottery

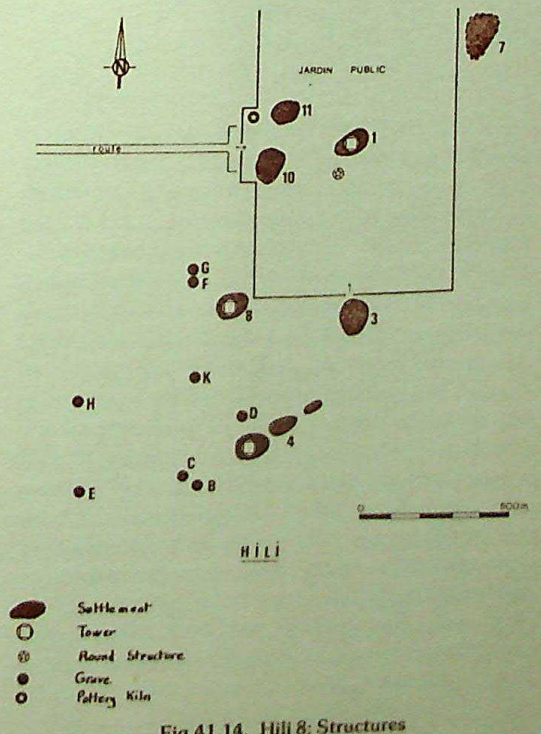


Fig.41.14. Hili 8: Structures

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

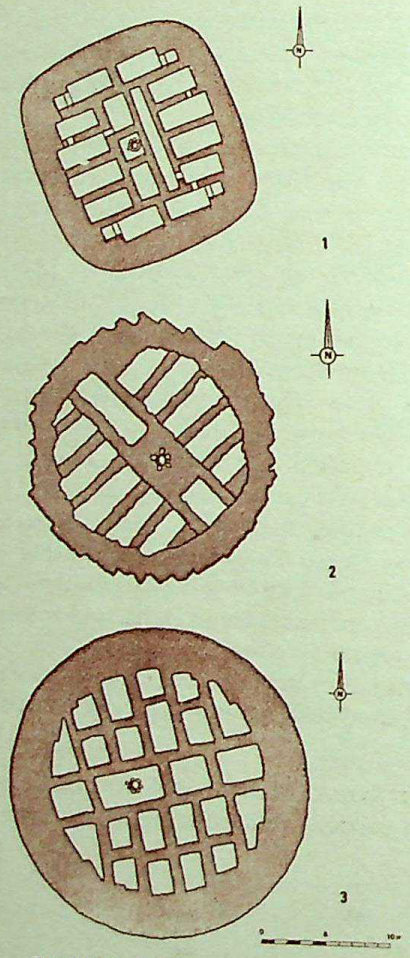


Fig.41.15. Hili 8: Round towers

of settlement. Both at Hili and Bat, several towers have been located within a radius of 20/30 hectares. There are smaller houses by the foot of these towers, and more houses are probably scattered between them. One cannot even exclude a more continuous pattern. Such an organization has been compared to what prevailed a few years ago in the interior oases of Oman: groups of houses or towers occupied by senior members of the social hierarchy (Frifelt 1976, Berthoud and Cleuziou forthcoming, for the mapping of such oases, see Le Cour Grandmaison 1977, Bonnenfant and others 1977). The landscape which can be reconstructed now on the evidence of paleoethnobotanical data does not contradict this picture. There could have been, as early as 3000 B.C., palm tree gardens, with fruit cultivation below the trees and cereals during winter time on the surrounding fields.

Coastal Settlement

Umm an-Nar, the only coastal sttlement already known, is located in the present day environment of the Sebkha coast, near the modern town of Abu Dhabi. The site differs from the oasis settlement both according to subsistence economy, settlement pattern and even domestic pottery.

The houses seem to be grouped along the seashore. These rectangular, multi-roomed buildings are made of dry stone masonry. The only construction so far published is a larger isolated building on the western edge of the site, interpreted as a warehouse (Bibby 1964), but there is evidence of smaller houses clustering together on centre of the settlement.

The stratigraphy at Umm an-Nar is far from clear. The large building rests on the bed-rock and has never been covered by a later construction. Six different phases during the use of that building were evidenced by the excavators. This gave the idea of a single occupation on the site, with a duration reduced to a few centuries. However, unpublished soundings at the centre of the settlement are still visible and show traces of two and may be three architectural periods.

The domestic pottery is rather different from that of the oases settlements. Painted vases with wavy lines do exist, but they are rather scarce. More common is a buff sandy-tempered ware with greyish slip. The shards are often coated with bitumen. Some shapes like concave lids with a central knob **(fig. 41.15 A.n. 4)** and pear-shaped jars with pointed base, high neck and folded-over rim **(fig. 41.15 A.n. 1,2)** are never found in the piedmontane oases. The latter is obviously to be compared with Mesopotamian vases (Frifelt 1975a : 369). Large storage jars with thickened rim and parallel undulating ridges ending in snakes' heads on the shoulder occur in all levels, with a higher frequency in the later layers (Frifelt 1975a : 365). This is to be compared with Tepe Yahya, where they occur in phases IVC to IVA, but mainly during phase B (Lamberg-Karlovsky 1970 fig. 32 G). K. Frifelt also quotes 'snakes' ware in the piedmontane oases at Hili (1975a : 369) and Bat (1976 : 60). However, no example of snake's head has been found[10], and to my knowledge, only single flat wavy ridges occur in these assemblages, on the shoulder of large storage jars where they form, from place to place, vertically pierced lugs (see fig. 41.10, from Hili 8).

As evidenced from the bone remains (Hoch 1979) or the archaeological items (copper fish-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

hooks, net sinkers of stone, etc.) the subsistence economy at Umm an-Nar was fully linked to the coastal environment. Fish, marine turtle and dugong were predominant in the diet, together with seabirds, while goat, cattle (zebu) and camel are occasionally found.

Stone and copper tools were in use, and there is evidence of copper-work (Frifelt 1979 : 572-573). Bitumen was widely used for coating the pottery and baskets, and probably other objects, like floats for fishing nets.

The Graves : More Insights On Chronology And Society

The graves were the first features excavated by archaeologists in the Oman Peninsula. Thorvildsen (1962) investigated seven graves at Umm an-Nar before moving his work to the settlement. Graves are highly characteristic all over the period and remarkably similar, both in construction, funerary items and burial customs all over he Peninsula. To my knowledge, graves have been excavated at Umm an-Nar (Thorvildsen 1962; al Noemi n.d.; Salman 1975 h-i), Hili (al Athar 1975: 29-37; Salman 1975: pl. 9; Cleuziou and others). Wadi Suq (Frifelt 1975a : 374-75 and fig. 63), Bat (Frifelt 1975a : 383-90; 1976), Amlah (de Cardi 1976 : 114 ssq), Maysar (Weisgerber 1980 : 92-94), Ras el-Hamra and various other places. They cluster in cemeteries always located in the close vicinity of the settlement.

These graves have been widely described in the above quoted papers. They are round, multi-chambered buildings, with entrances facing south and north. In the most common type, the inner space is divided into two parts by an east/west crossing wall, both parts being subdivided into two, three four rooms. There are several variations, sometimes with only one door **(fig. 41.16)**. The outer face is made of nicely worked stones with a slightly curved face, described by K. Frifelt as 'sugar lump stones' (1975 : 386). The basis of the wall slightly protrudes. Inside, the dry stone masonry walls corbel out in order to narrow the space to be covered by flat capstones (de Cardi and others 1976 fig. 14, Salman 1975 pl. 6). This reconstruction is sometimes discussed.

Inhumation was collective, with up to several dozens of skeletons in the same grave. Due to plunderings, but also to the fact that no precise record has ever been published, it is difficult to add anything else.

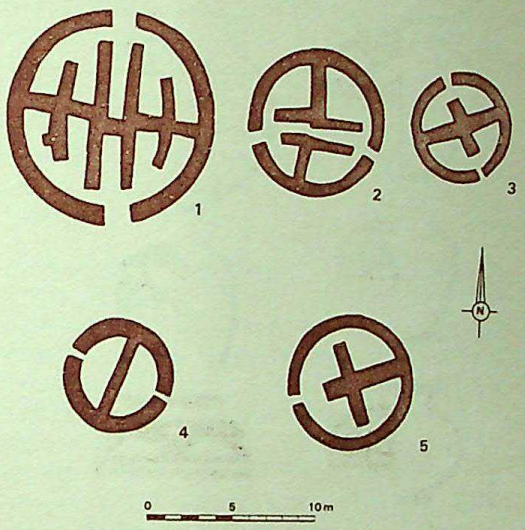


Fig.41.16. Umman-Nar: Round graves

Funerary items were abundant, and also very distinctive of the graves.

Funerary Wares: At Umm an-Nar, the graves yielded some common wares and also several classes of fine pottery which are only found in the funerary context. These potteries are also the ones which can best be compared with the surrounding cultures, and they have been widely used to establish the chronological position of the Omani sites.

Black-on-red pottery **(fig. 41.17, 18)** is found as black painted decoration on red ware or black-on-red slipped, buff or red ware. Cylindrical jars with a small everted neck, bearing a decoration of chevrons on the shoulder, are the most common type **(fig. 41.16 n. 1, 5, fig. 41.17 n. 2)**. Globular jars also occur, bearing the same pattern **(fig. 41.16 n. 3, fig. 41.17 n.7)** or more sophisticated geometric decoration, including animals: a zebu (Thorvildsen 1962 fig. 23) and an oryx (Salman 1975a pl. 8B). Excavations of a grave by the French Archaeological Mission at Hili yielded a so-far unique globular pot with a stylized frieze of caprids, a pattern usually found only in the grey ware **(fig. 41.16 n. 4)**

Black-on-grey painted ware mainly includes the canister jars decorated with friezes of caprids **(fig. 41.16 n. 6, fig. 41.17 n. 1-3, from Hili, fig. 41.18 n. 5 from Umm an-Nar,** see also Frifelt 1975a fig. 33 c,e,g, from Bat). This pottery is classically compared with Bampur IVc to VI. Decoration covers the whole body, geometrical

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

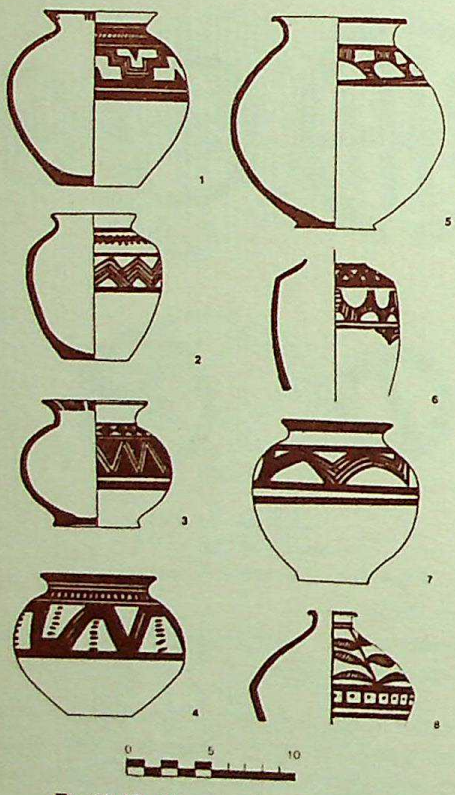


Fig.41.18. Umman-Nar: Painted pottery

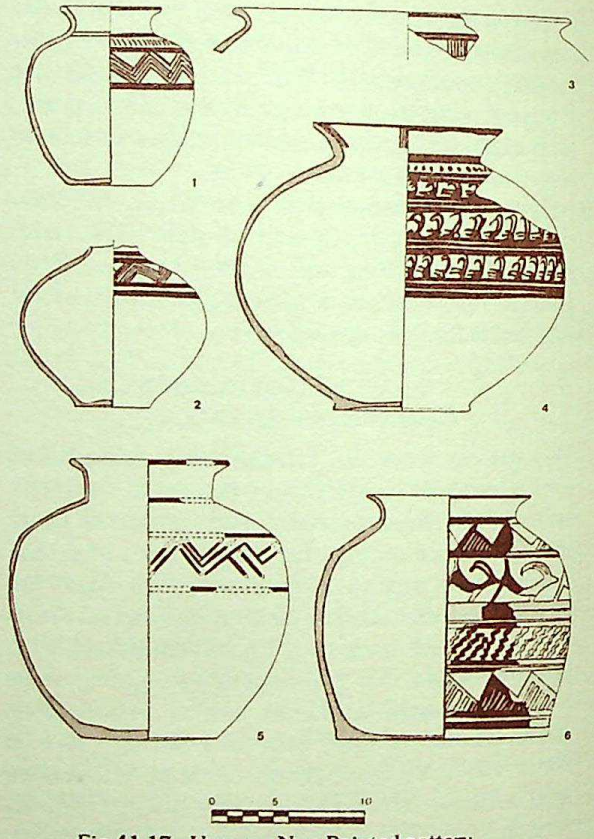


Fig.41.17. Umman-Nar: Painted pottery

pattern being also very common (**fig. 41.19 n. 2, 6, 7,**). Less common are globular pots with geometrical designs (**fig. 41.17 n. 4, fig. 41.19 n. 7**). In only one case, is a meandering ridge between horizontal ridges associated with painted decoration, at Umm an-Nar (**fig. 41.19 n. 4**).

Incised grey ware occurs mainly in cylindrical jars with an everted neck (**fig. 41.19 n. 1, from** Umm an-Nar, see also de Cardi and others fig. 15 n. 1,2, from Amlah) or as high beakers with an everted rim (**fig. 41.19 n. 3, from Umm an-Nar, fig. 41.18 n. 5, from Hili,** see also de Cardi and others fig. 15 n. 4,5,11, etc. from Amlah). The decoration covers the whole body of the pot. It mainly includes panels of hatched triangles, undulated horizontal lines and the 'sagging lintel' motif which only appears on high beakers, which are often called 'hutpots'. Low beakers with decorations of hatched triangles are also found (**fig. 41.20 n. 6**). The distribution of that kind of vessels, usually considered to be imitations of chlorite vases, has already been studied by During Caspers (1970; see also de Cardi and others

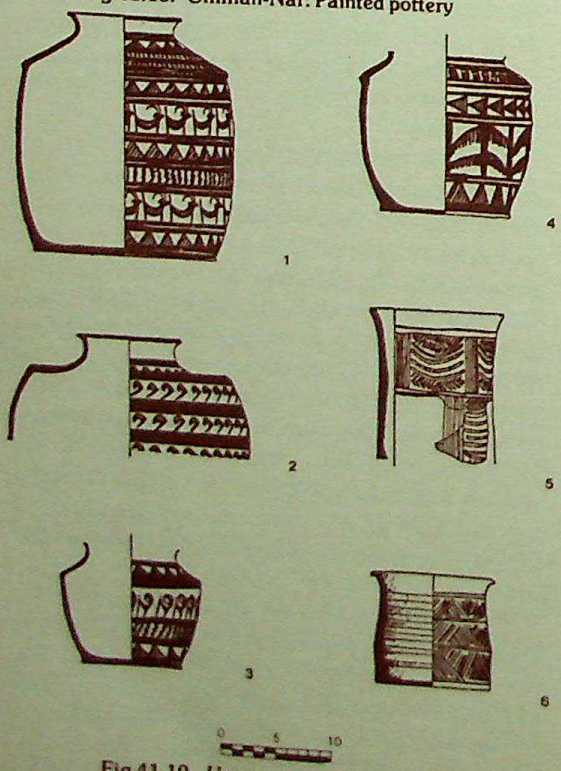


Fig.41.19. Umman-Nar: Painted pottery

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

1976: 118-122).

Small suspension jars of brown-on-buff painted ware are also a rather distinctive feature **(fig. 41.21)**. They seem to be rare on the coast at Umm an-Nar, and to be more characteristic of the piedmont oases (Frifelt 1975a : 368).

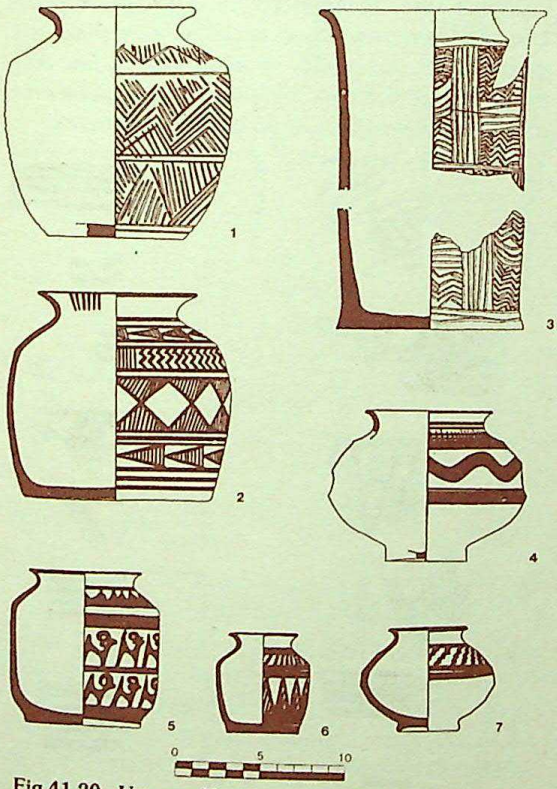


Fig.41.20. Umman-Nar: Incised and Painted wares

Chlorite Vessels: The chlorite vessels are mainly related to two types: small hemispherical bowls decorated with a single row of concentric dotted circles below the rim (Frifelt, 1975a: fig. 17d, from Hili, fig. 28e, from Bat; de Cardi and others, 1976: fig. 21 n. 3 from Amlah) and rectangular compartmented boxes with the same type of decoration (Frifelt 1970: fig. 3A, from Hili, 1975a fig. 21d, from Bat; de Cardi and others, 1976: fig. 23 n. 4, from Amlah). A single piece of a vessel with an engraved 'mat' decoration belonging to the 'intercultural style' defined by Kohl (1975) was found in a grave at Umm an-Nar by the Iraqi mission (al Noeimi n.d.) and is now at the al Ain Museum (Cleuziou 1980b : 54).

Metal objects seem to have been often looted, but copper weapons (daggers, swords, tanged spearheads) and chisels were found at Umm an-Nar (Frifelt 1975a: fig. 12bis; Cleuziou 1980b: 54), Hili (Bibby 1975: fig. 4) and Maysar (Weisgerber 1980: fig. 78 n.11)

Personal ornaments occur, mainly in the shape of beads of bone, shell, copper, and various stones, including a few beads of lapis lazuli. a unique band of gold was found at Umm an-Nar (Salman 1975 pl. 7B).

Chronology: Chronological ordering of the graves is rather difficult, as they probably remained in use for a long time. Some items, like chlorite vessels with double-dotted incised circles, point towards quite a late dating in the third millennium B.C. , according to the chronology of such objects in southern Mesopotamia and Khuzistan (de Miroschedji 1973). But the value of this chronology for the Oman Peninsula itself, where these objects are probably locally produced (Kohl and others 1979) is still a matter of discussion. The black-on-grey canister jars with friezes of caprids and the incised grey ware, which appear at Shahr-i Sokhta IV, have lead M. Tosi (1976) to suggest a date in the late third millennium B.C. for Umm an- Nar and Hili. Black-and-grey ware of that type is known at Bampur, where it appears in period IVc and characterizes periods V and VI (de Cardi 1970). Some potsherds of that kind are also found at Tepe Yahya IVB (Lamberg-Karlovsky 1970: fig. 24L; see also Lamberg-Karlovsky and Tosi 1973; fig. 126). Moreover, canister jars are not the only shape of black-on-grey ware found in Oman Peninsula. Globular pots with geometric designs were also found **(fig. 41.18 n. 4)** which can be compared to objects from Shahr-i Sokhta III (Salvatori 1978: fig. VI) or Shahr-i Sokhta II/III (Lamberg-Karlovsky and Tosi 1973: fig. 145). Painted decoration on some black-on-red vases also recalls period IVB at Tepe Yahya (Lamberg-Karlovsky 1970: fig. 24 B,G for instance; see also Lamberg-Karlovsky and Tosi 1973: fig. 127).

The unique piece of 'intercultural style' chlorite vessel also points towards Tepe Yahya IV B. This would also be the date when incised grey ware appeared, if the assumption that it is an imitation of 'intercultural style' chlorite vessels is a right one. Here again, the Bampur sequence, where these vessels appear as early as IVb and continue to the end of IV would be an argument for a long duration.

All these chronological parallels are far from

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

clear, but the material found in the graves can be reasonably attributed to at least half a millennium time span. As it commonly happens when dealing with collective burials used during a long time, the later dating of some objects are nothing more than a *terminus post quem*.

A further argument in favour of a very long duration of the collective burial is the occasional use of grave facing stones in the stone basement of Building II at Hili 8, a building related to the earliest architectural phase of our period, that is probably in the second quarter of the third millennium B.C. Such an occurrence is commonly interpreted as a re-use of stones plundered from the graves, but this would contradict all other chronological data, including ^{14}C and the fact that domestic pottery related to later architectural phases on the site was found in graves. We have indeed to assume that stones produced to build the graves were occasionally used in the buildings[11]. This would lead us to conclude that the collective graves were in use all through the period, that is for *ca.* 700 years.

Graves usually cluster in cemeteries in close vicinity to the settlements. They vary in size (from 2 to 10 rooms, from 3 to 15 m in diameter) and aspect. Facing is usually made with the common 'sugar lump stones', but bigger stones, up to more than one metre in length, are used in some of the biggest monuments (Throvildsen 1962: fig. 2,6; Salman, 1975a: pl. 9A). Sometimes, like at Wadi Suq (Frifelt 1975a: fig. 63) or at Maysar 3 (Weisgerber 1980: fig. 57) there are no 'sugar lump' facing stones, but one cannot tell if this character is of any particular significance. Generally speaking, it is presently impossible to interpret the differences noticed among the graves. There never was enough information left, gathered or published, to allow one to say anything about the link between these cemeteries and the social organization of the settlements.

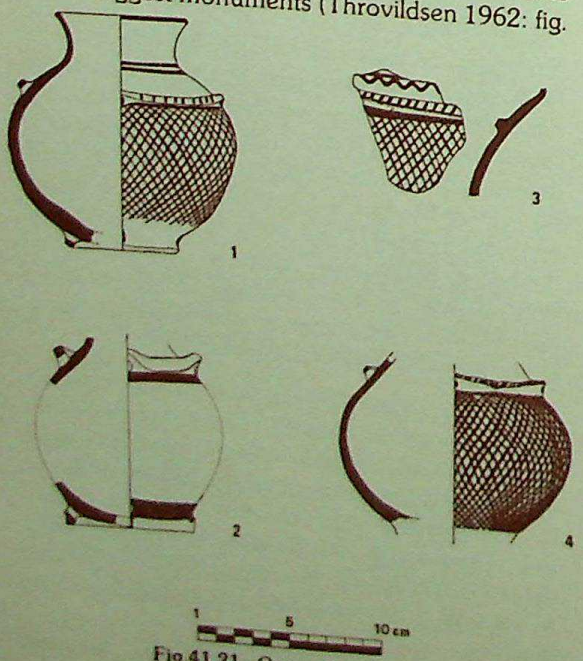


Fig.41.21. Oman: Painted jars

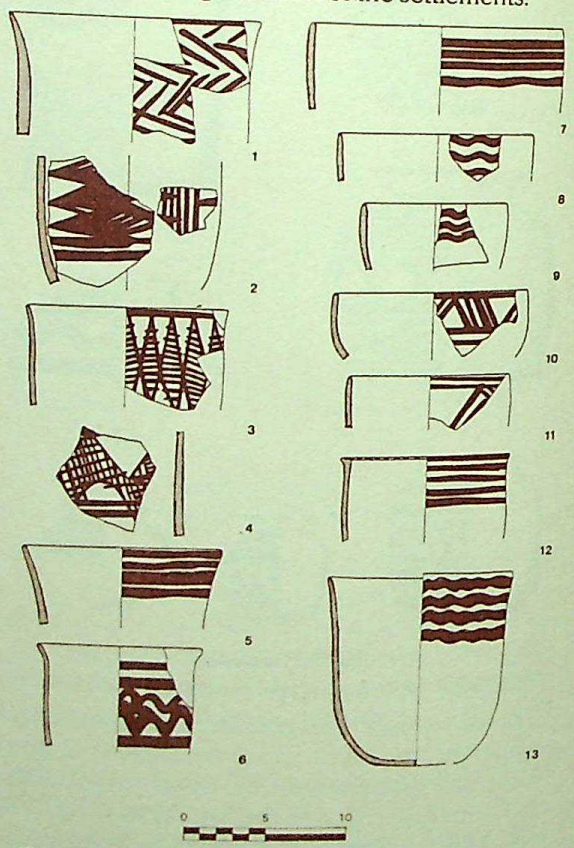


Fig.41.22. Oman: Painted beakers, 2nd millennium

The round structure excavated by the Danish team at Hili (Frifelt 1968 1970) is uncommon. Its ground plan is that of a grave, with two entrances — facing north and south, an east/west dividing wall and the two parts subdivided into two rooms. But the size of the facing stones is unusual, the monolithic blocks in which doors are pierced being, for instance, 2.5 metre high and 1.5 metre wide. The monument itself has been estimated to be at least four metre high, which seems to be much more higher than all the best preserved graves. The number of rooms itself is uncommon: just four rooms for a building 12

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

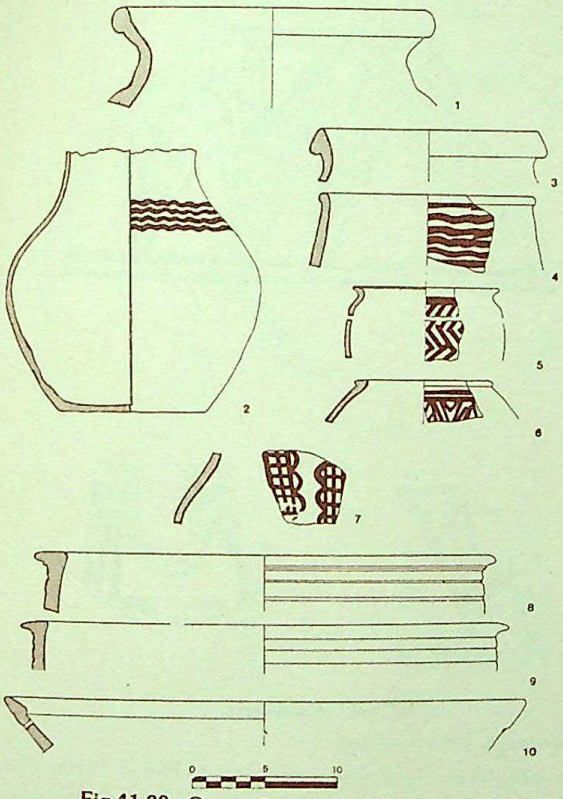


Fig.41.23. Oman: Jars, 2nd millennium

metres in diameter, while similar sized graves at Umm an-Nar or Hili include usually eight or ten rooms. The unique features also include holes pierced through the facing blocks and wall, allowing one to look in from the outside into the southern rooms (two in each room) and a well dug into the floor of the south-eastern wall.

The doors were adorned with reliefs: two
181 humans, hand-in-hand, between two oryxes on the southern door, a man, a donkey, a standing man wearing weapons, a couple embracing and two cheetahs devouring a gazelle on the northern one.

Grave II at Umm an-Nar also yielded engravings of animals: a bull, a gazelle and two camels, but in a much cruder style (Thorvildsen 1962: fig. 7,8). The reliefs of Hili seem to have been of a much more symbolic value.

Fragments of more than 500 vessels were found during the excavations, all the classes of funerary ware being present. There were no bones (Frifelt, 1975: 368) while the other graves at Hili were as badly preserved as the round structure and a lot of bones were found in them. One may wonder if this is only due to the fact that no bones were preserved or if the monument was never used as a grave.

The situation of this exceptional 'grave' is itself exceptional. It is located in the middle of the settlement area **(fig.41.14)** and not in the cemetery. While being reluctant to consider this monument a temple, one may, at least admit that its situation and character leads to such an interpretation.

A relief of a man, very similar in style to those of the round structure at Hili, was found in the central part of the settlement at Umm an-Nar during a visit in 1977. It is now on display in the al Ain Museum (Cleuziou 1980b: 54). One may not exclude that a place with a function similar to the Hili round structure existed also at Umm an-Nar.

The middle and late third millennium are clearly a period where oases and coastal economies reached a high degree of adaptation in the Oman Peninsula, developing into an original culture. This culture presents obvious links with south-eastern Iran, as evidenced by pottery, but these links are not clearly understood. It is during this period that Makkan appears in the cuneiform records, together with Meluhha. Recent work on the 3rd millennium copper mining and smelting site at Maysar (Weisgerber 1980), and archaeometrical studies on the copper-supply of Greater Mesopotamia (Berthoud 1979; Berthoud and Cleuziou forthcoming), leaves no doubt about the fact that the Oman Peninsula was the origin of the copper used in southern Iraq and Khuzistan in the second part of the third millennium B.C., and leads us to accept the identification of the Oman Peninsula with Makkan. According to Berthoud (1979: 119-120), the copper of Oman reached Mesopotamia as early as ED III, that is even before Makkan was quoted in the texts.

THE EARLY SECOND MILLENNIUM

This period introduces a complete change in settlement patterns, funerary customs, and possibly economy. I have elsewhere (Cleuziou 1981) made an attempt to characterize these changes, which I would like to summarize here.

The change in pottery is the most obvious feature. Older wares are no longer in use and are replaced by a buff to light red pottery, coarser in paste, often coveredwith a distinctive red slip, sometimes with a buff or purple one. Geometric decoration in black paint differs from the previous period. Wavy lines disappear and are replaced by undulated lines, chevrons, black or

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

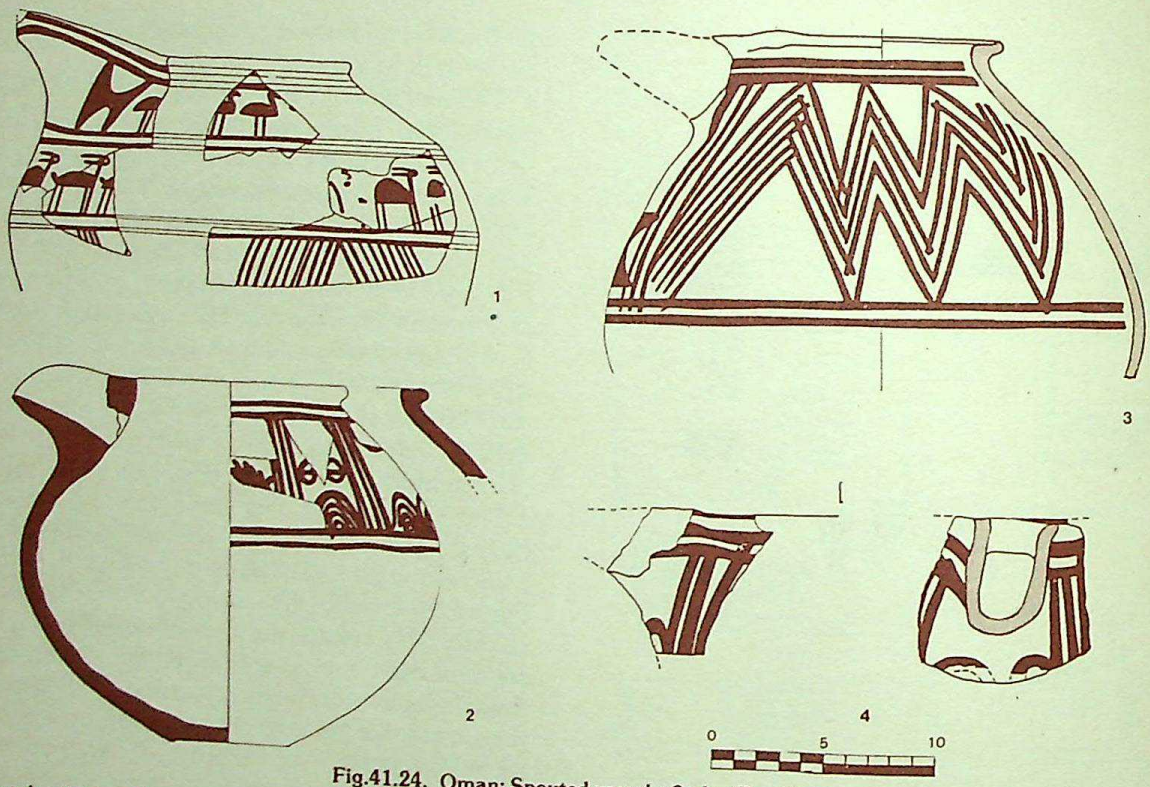


Fig.41.24. Oman: Spouted vessels, 2nd millennium

hatched triangles, concentric half-circles between groups of vertical lines, etc. Shapes also change and new ones include spouted vessles **(fig. 41.24)**, beakers **(fig. 41.22)**, necked jar with a rolled rim **(fig. 41.23 n. 1, fig. 41.25 n. 1,3,)**. New types of chlorite vessels occur **(fig. 41.26)** with a decoration of single dotted circles, horizontal lines and groups of alternate oblique lines covering the whole pot. New types of metal objects occur, including socketed spear-heads and triangular dagger blades with a concave base.

Only one settlement belonging to that period has been excavated at Hili 8, where it marks the end of the archaeological sequence. The round mud-brick towers are no longer in use, but the low mound of their ruins is encircled by one or more stone walls **(fig.41.5)**. There are traces of living floors inside and outside this enclosure. A ^{14}C date of 1990 ± 110 B.C. has been obtained from a fireplace lined with stones [12]. Unfortunately, no clear plan of this settlement could be traced from that very poorly preserved layer, located just below the surface.

Only site BB 21, recognized by the Harvard Expedition to Oman in the Wadi Bahla, has yielded the plan of a structure which may be compared to this later period at Hili 8. Here also, according to the sketch-plan published (Humphries and othes 1975: fig. 7) there are rooms around a central courtyard, clustering against the inner wall of a circular enclosure. Unfortunately, no potsherds were found at BB 21.

Surface finds of potsherds related to that period were collected at Tawi Sa'id in the Wadi al Batha (de Cardi 1977: fig. 2 n. 29-59), and possibly at 'Abaya, south of Muscat (de Cardi 1977: fig. 1 n. 1-25), and Shari'ah in the Wadi Samad (de Cardi and others 1976: fig.1 n. 26, 27).

Graves are of two different types. Collective long burials have been excavated at Shimal, near Ras al Khaimah (Donaldson, to be published; see also de Cardi 1971: 236; Ash 1978). These are long monuments above the surface of the ground, covered by inclined slabs, with an entrance on one of the long sides. Pottery is similar to that of the settlements. Chlorite pots and copper or bronze objects are abundant. An Indus Valley cubic stone weight has been found in one of these graves. A rather similar monument has been excavated in emergency near al Ain. No pottery was recorded in it, but stone vessels and copper objects were similar to those of Shimal (al Athar 1975: 28-31, al Noeimi, n.d.). For small

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

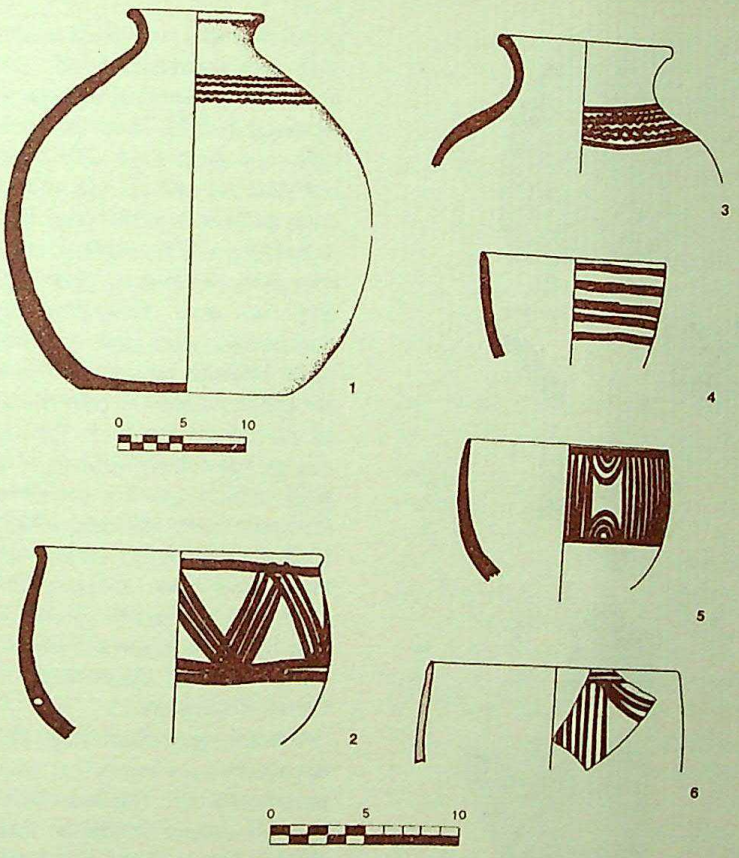


Fig.41.25. Oman: Jars and bowls, 2nd millennium

representations of animals made of a sheet of gold or electrum worked with the *repousse* technique are unique. They represent two pairs of addorsed caprids, a 'lion' and a caprid. They were designed to be sewn on clothes. A small bull figurine cast in silver was also found.

Single graves of the same cultural period have been excavated by K. Frifelt (1975a) in the Wadi Suq, near Sohar, and in the Wadi Sunays I near Ibri. They are rectangular stone cists dug into the ground, covered by flat capstones and a low mound lined by a circle of stones. The pottery (Frifelt 1975a: fig. 20-27) is similar to that of the settlement a Hili 8. Other similar graves were excavated at Khudar in the Wadi yielded similar pottery, stone vases, copper objects and some gold beads.

It is not possible to tell whether the occurrence of collective burials and single burials has any chronological or geographical meaning.

The duration of the period is not clear. It obviously was initiated around 2000 B.C. and may have lasted for several centuries. The important fact is that this culture is the only one known between third millennium B.C. and the beginning of the first, when a well known Iron Age starts,around 750 B.C. This gap has been interpreted in various ways. I have suggested that it could be related to the shift of the inhabitants of the Oman Peninsula to full-time nomadism based on camel herding, assuming that camel was slowly domesticated during the third millennium B.C. (Cleuziou 1981). This remains, however, to be demonstrated.

What is sure is that this period is at least partly contemporaneous with the Indus Civilization, as will be examined now.

The relations between the Oman Peninsula and the Indus Civilization have been mainly studied within a hypothetical frame, with little reference to a comprehensive interpretation of local data in Oman. Several attempts were made to compare isolated objects, copper tools for instance (During Caspers 1970). Other attempts involved interpretation of cuneiform records and assumptions on the structure of trade in the Gulf

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

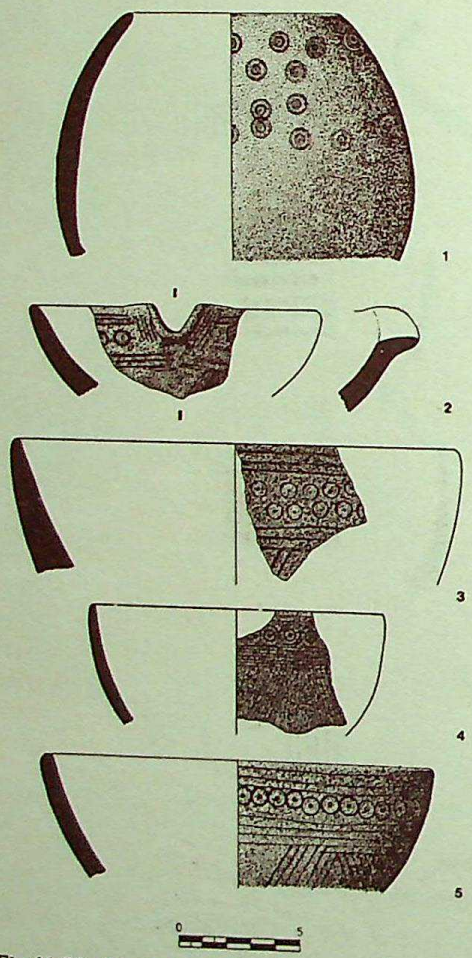


Fig.41.26. Oman: Jars and bowls, 2nd millennium

during the 3rd and early 2nd millennium B.C The lack of information on the Oman Peninsula itself, never allowed us to interpret such comparisons clearly, or to be precise about some very broad statements. I would like now to review the various possible links of the Oman Peninsula to the East, according to the cultural frame already discussed.

A REVIEW AND POSSIBLE INTERPRETATION OF EASTERN CONNECTIONS

Eastern Connections According to Artefacts

Pottery

Relations evidenced by pottery can be reviewed according to two kinds of artefacts: exchanged objects, clearly of foreign origin, and similarities in shape or decoration **(fig. 27)**.

Exchanged objects are rare, but do exist. Ten potsherds of a well-fired reddish micaceous ware, with red slip outside and often dark greyish slip inside were found in the early second millennium layers at Hili 8. There is no doubt that the outer face was decorated with black painted patterns, but this decoration has almost vanished and no clear pattern can be seen. Such a ware is unique in the Oman Peninsula. It sharply differs from the common painted or plain pottery of that period and is very probably imported. Although comparisons on such a matter are never safe, I have already suggested the Indus related origin for these potsherds (Cleuziou 1981). A rim sherd of a large storage jar in the same ware was found during the winter season of 1980/81 **(fig. 41.29 n.4)**, which can be compared to pottery from Mohenjo-daro (Mackay 1937: pl. LIX B,C,D ; pl. LXII n. 46,47,49) where it ranges among the most distinctive shapes. One cannot rely too much on such evidence, but it is to be considered that this type of rim is completely unknown in the early second millennium assemblage of the Oman Peninsula.

Another potsherd **(fig. 28 n. 3)** may also be considered an import. It was found in a context associated with the 3rd architectural phase of our second period at Hili 8, that is probably in the third quarter of the third millennium B.C. It is a fragment of a pedestalled vessel, and the pottery is closer to the probable Indus related imports quoted above than to the common wares of that period. Although pedestalled vessels are a recurrent feature among the Indus Valley pottery, they are also found in south-eastern Iran, for instance at Tepe Yahya where they occur as early as IV C (Lamberg-Karlovsky and Tosi 1973 fig. 107, lower row left) and continue in period IVB (Lamberg-Karlovsky and Tosi 1973 fig. 129), in red or in grey wares.

Potsherds 1 and 2 on fig. 41.28 are made of the common reddish buff sand tempered ware which characterizesthe middle and late third millennium in the Oman Peninsula: no.1 was found in the early 2nd millennium layer, where such a paste is out of context; n. 2 is safely associated to the second architectural phase, that is *ca.* 2500 B.C. They are fragments of pedestalled cups with concentric rows of 'finger nail prints' inside, a very distinctive item associated with Harappan and Harappan related assemblages. But the ware seems local, and it is impossible to decide if these potsherds were imported or are just an indication

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of cultural interaction.

Felines with a striped body, painted in dark brown on buff paste, was found in a tomb at Hili (unpublished). This potsherd is among the very few ones recalling the Kulli ware, a comparison claimed a few years ago by G. Bibby (1970: 297) for the whole funerary wares and to which I cannot agree. Another unique shard with a striped fish was recovered at Araqi by de Cardi (de Cardi and others 1976: fig. 25 n. 298). It can be compard with Harappan (Casal 1964, fig. 78 n. 343) or Kulli wares, but such designs are also found in south-eastern Iran at Bampur V (de Cardi 1970: fig. 38 n. 366)

Dales (1979, fig. 11) publishes a jar from Balakot which he considers an import of possible Omani origin. The decoration of short lines on both sides of groups of vertical or oblique lines is certainly found at Bampur and, in one case, at Umm an-Nar (Salman 1975: pl. 8B), but is also rather common in the western Baluchistan area all over the 3rd millennium B.C. Moreover, the geometric decoration covering the whole body of a black-on-red or buff painted jar is unknown in Oman.

Serious problems concerning imports arise with the black-on-grey and incised grey wares. This has already been discussed by de Cardi (1970), During-Caspers (1970), Lamberg-Karlovsky and Tosi (1973) and I do not intend to discuss it fully again.

Black-on-grey painted ware originates in the 4th millennium B.C. (Faiz Mohammad painted ware) and is widely distributed in south-eastern Iran and Pakistani Baluchistan (Lamberg-Karlovsky and Tosi 1973: map 4), but completely unknown in the Indus Valley. All the black-on-grey ware found in Oman Peninsula bleongs to the late horizon of this black-on-grey ware found in south-eastern Iran (Lamberg-Karlovsky and Tosi 1973: 40) and it is at least clear that the use of this pottery in Oman is related to a foreign .tradition.

The incised grey ware is closely related to the late black-on-grey ware.Its distribution seems to be restricted to south-eastern Iran and the western part of Baluchistan (During-Caspers 1970). Shape and decoration are absolutely similar on both sides of the strait of Hormuz. This is particularly obvious in the case of incised grey ware, with only three types of vessels: canister jars and low beakers with a covering decoration of hatched triangles,and the so-called 'hut pots'.

Are these potteries produced in Oman Peninsula, or are they imported from south-eastern Iran? The question never received a satisfactory answer, and it will certainly remain like that until a comprehensive archaeometrical study is done. If there was an exchange network, this was on a very large scale, as these potteries were found in significant numbers all over the Oman Peninsula.

What is sure is that these potteries were strictly restricted for funerary use in the Peninsula, while they appear in cemeteries and in settlements in south-eastern Iran. Black-on-grey ware was

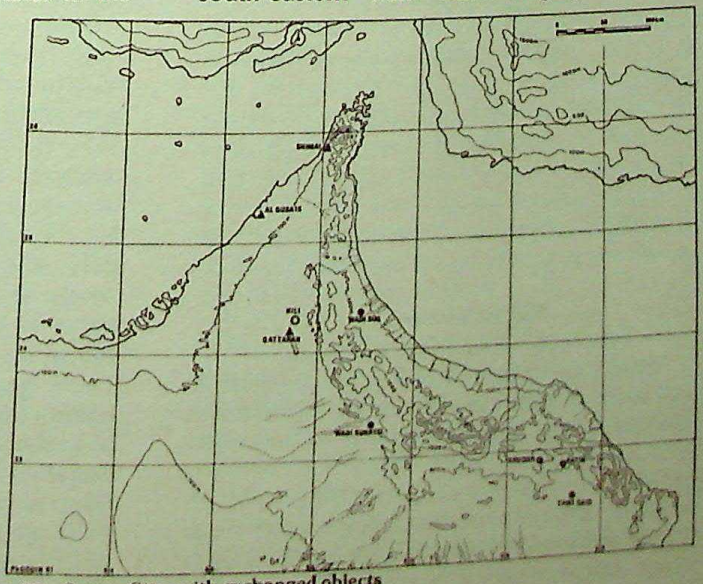


Fig.41.27. Oman: Sites with exchanged objects

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

found in graves in the shape of globular jars at Shahdad, Shahr-i Sokhta III (Salvatori 1978 : 8 and pl. 8), Khurab (Lamberg-Karlovsky and Schmand-Besserat 1977 fig. 7 n. 31-33) and in the shape of large bowls related to the Faiz Mohammad painted ware at Damin (Tosi 1970: fig.10a, 11). It is also found in the settlements at Shahdad (Salvatori 1978: 8), Tepe Yahya IVB (Lamberg-Karlovsky and Tosi 1973: fig. 145), and BampurIV 1 and IV 2 (de Cardi 1970: fig. 25 n. 259, fig. 28 n. 264). Canister jars with animal friezes occur in the settlement context at Tepe Yahya IVB (Lamberg-Karlovsky 1970: fig. 24 L) and mainly at Bampur IV 3 to VI (de Cardi 1970 fig. 37, 38, 43). An isolated vessel was found at Shahr-i Sokhta IV 1 (Tosi 1976: fig. 4). The incised grey ware broadly follows the same distribution pattern.

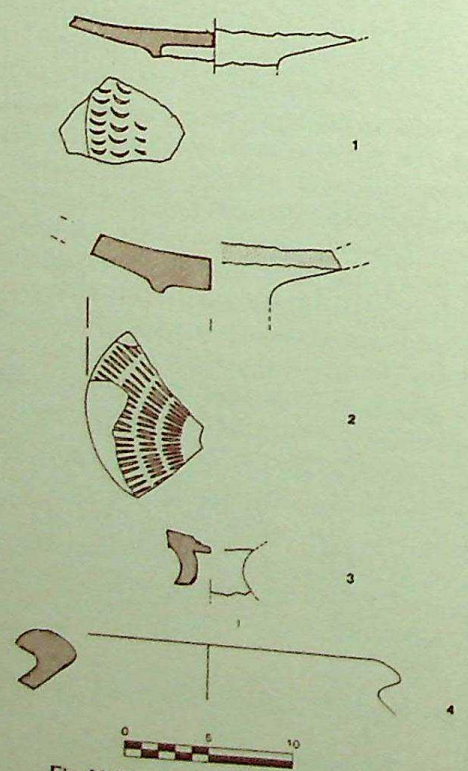


Fig.41.28. Oman: Pottery from outside

This difference between the Oman Peninsula and south-eastern Iran remains unexplained. But one can at least suppose a cultural reason behind it.

Other relations founded on pottery are much broader. Black-on-red fine painted ware is also found at Bampur, Shahdad, Damin, Khurab and Tepe Yahya, where it represents 10 per cent of the pottery finds during periods IVC and IVB (Lamberg-Karlovsky and Tosi 1973: 43). The decoration of chevrons on the shoulder of vessels is common everywhere. Hatched bands between semi-circles **(fig. 41.18 n. 6)** are known at Shahdad and Bampur, hatched zones combined with semi-circles **(fig. 41.18 n. 5)** are found at Tepe Yahya IVB (Lamberg-Karlovsky 1970: fig. 24 B,G). Vegetal decoration combined with a horizontal line of dotted squares **(fig. 41.18 n. 8,** from Hili) is very common on Harappan pottery (Mackay 1937 pl. CXXXVI no. 6 for instance), but it appears just once in Oman.

Other Items of Possible Eastern Origin

Beads of eastern origin have sometimes been noticed in the Oman Peninsula. Among them are green glazed segmented beads, which may be also related to Egypt (Frifelt 1957b: 67). Cornelian has also been quoted for its eastern origin, but no example of the characteristic long cornelian beads of the Indus Valley was ever found. A unique etched cornelian bead from grave II at Umm an Nar (Reade 1979: 11) is of very simple shape, with no parallel published from the Indus sites (Reade 1979: 24).

A square stone weight of the Indus Valley type was found in a long grave of early 2nd millennium type at Shimal (Ash 1978 : 7). One must recall here that cubic stone weights were also found in contemporaneous layers of Qala'at al-Bahrain II (Bibby 1970: pl. XVIII, bottom).

During the excavation of grave M at Hili, two small figurines with a flat base and a tetrahedra were found outside the grave, together with more than 2000 potsherds of common domestic ware. They are made in the same reddish-buff, sandy tempered paste **(fig. 41.29)**. The excavation is to be continued and the context is not very clear, but the date is certainly in the second part of the third millennium B.C. One is broken and has no proper shape **(fig. 41.29 n. 1)**, the other bears traces of black paint and represents an animal, whose head is partly broken **(fig. 41.29 n. 3)**. These figurines have no clear parallels in south-eastern Iran, but may be compared to some items of Lothal (Rao 1973 pl. XXXIV A, second row). Tetrahedras are also known in the Indus Civilization, at Mohenjo-daro for instance (Mackay 1937: pl. CXXXIX n. 11,12, pl. CXLII n. 63, 64, 73) where they are usually glazed, and at Lothal (Rao 1973: pl. XXXIV A, lowest row). One may

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

hesitate to reconstruct a chess game with Rao (1973: pl.XXXIV B) but these objects can probably be considered gamesmen and may be linked to the Indus Civilization.

Ecological Links Between Oman Peninsula And The East

Animal herding and agriculture may help to trace further links between Oman Peninsula and the East.

The zebu is present among the bone remains at Umm an-Nar, but in a small amount: less than 30 bones (Hoch 1979: 613-16). A representation of a zebu is well known from a unique painted vessel on the same site (Thorvildsen 1962: fig. 23) and another one is engraved on a facing stone of grave II (Thorvildsen 1962: 211). The zebu is also depicted on the seal of Maysar 1(Weisgerber 1980: fig. 77) and several possible representations of the zebu on Omani rock-art are sometimes related to the 3rd millennium B.C., the best known being the Bilad Said one (Clarke 1975: pl. 4). The zebu is known at Shahr-i Sokhta since the first period (Tucci and others 1979: 211-12) and it obviously reached the Oman Peninsula through eastern Iran.

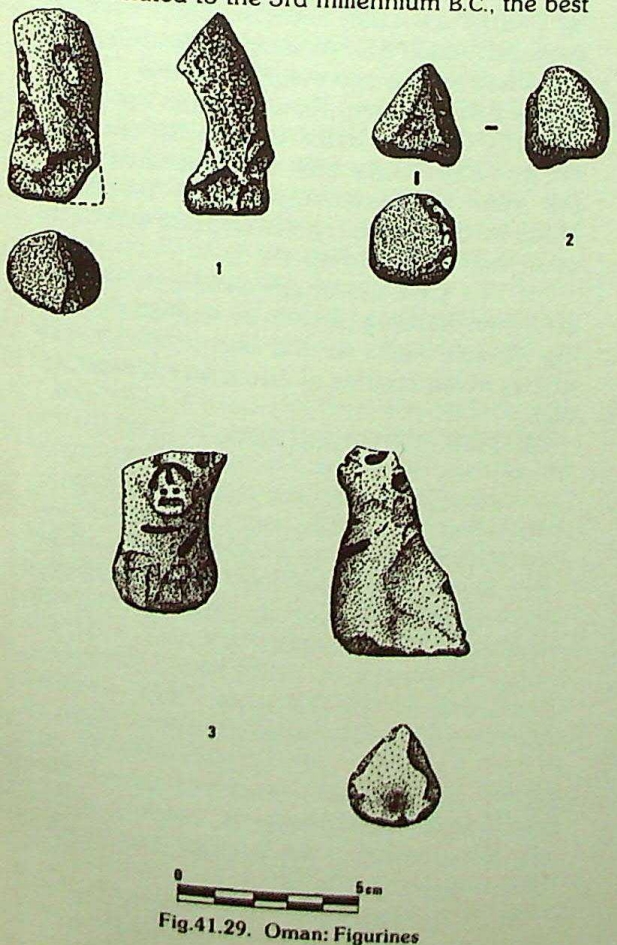


Fig.41.29. Oman: Figurines

Sorghum samples at Hili 8 are a rather puzzling piece of evidence. They have already been discussed (Cleuziou and Costantini 1981) and considered a link between the possible centre of origin in eastern Africa and the Indian world, where it became a major food-crop in the second millennium B.C. (Possehl, forthcoming). The presence of sorghum is now certain at Hili as early as the early 3rd millennium B.C., and this matches the assumption already proposed in the above quoted paper, that the Oman Peninsula may have acted as a spot on a land-bridge between eastern Africa and the Indian subcontinent. I do not need to emphasize the importance that could be attributed to that 'invisible link', if confirmed by further investigation.

It must be admitted that this review of evidence is rather disappointing. Clear links supported by material evidence are difficult to interpret, or scarce. Difficult to interpret, too, are the relations between the Oman Peninsula and south-eastern Iran. This is due to the still confused state of archaeological informations, both in the Oman Peninsula where our sequence is still tentative and needs, at least, more data, and in the Makran where the date of Bampur and neighbouring sites is still a matter of discussion (Lamberg-Karlovsky and Schmandt-Besserat 1977) and where further excavations are certainly necessary. Scarce too, are the items directly related to the Indus Valley, except for pottery, in the Oman Peninsula itself and, as Dales says, 'archaeology of trade is an allusive subject at best, and leaves few artifactual traces' (1979: 265). This is probably true for other type of relations, as demonstrated by the sorghum evidence. I would like, however, to suggest the following guidelines.

The 3rd millennium cultures of the Oman Peninsula may originate from an unknown 4th millennium background, in Oman or somewhere else in the Arabian peninsula. They cannot be considered a simple extension of south-eastern Iranian cultures.

Strong cultural contacts between the Oman Peninsula and south-eastern Iran occurred in the second quarter of the 3rd millennium, and lasted

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

at least for half a millennium. Presently, possible relations of the Oman Peninsula with the Indus Civilization cannot be distinguished from these contacts, and may have occurred directly or through them.

Direct relations between the Oman Peninsula and the Indus area are still evident in the 2nd millennium B.C. even if evidence is scarce. At that time, cultural links between Oman and south-eastern Iran are unknown, but this may be due to the poverty of archaeological research.

I certainly do not advocate here that relations between the Oman Peninsula and the civilizations east of it were poor. But these relations are still difficult to trace, and progress in this direction is certainly related to further archaeological research but also, I believe, to improvement of archaeological methods.

NOTES

1. The French Archaeological Mission to Abu Dhabi is sponsored on a joint venture of the French Ministere des Affaires Etrangeres, Direction Generale aux Relations Culturelles, and of the Department of Antiquities and Tourism of the Emirate of Abu Dhabi in al Aïn. Drawings are by Mr. P. Govin.

2. For a detailed study, see Frifelt 1970, During Caspers 1971: 38-42, Tosi 1975, Cleuziou and others 1978: 12-18.

3. In this paper, I use ^{14}C dates with dendrochronological correction according to Damon and others, 1972, a system which agrees with the frame used on the other side of the strait of Hormuz at Tepe Yahya. This leads to dating the Jamdet Nasr period around 3400-3200 B.C. 2 or 3 centuries earlier than the traditional chronology. I do not intend here to argue in favour of one system or another. If one disagrees with the corrected ^{14}C chronological frame, one must recognize that the relative chronology presented is of some value, whatever the system adopted.

4. K. Frifelt (1975b: 176) quotes possible traces of cream slip on a vessel from Mazyad.

5. Two samples of charcoal from fireplaces related to the construction of Building III were dated 4400 ± 100 BP by the late Mr. J. Thommeret (MC 2266 and 2267).

6. Paleobotanical samples are studied br Dr. L. Costantini, Museo Nazionale d'Arte Orientale, Rome. See also Cleuziou and Costantini, 1981.

7. Respectively 3900 ± 100 BP (MC 2265) and 3840 ± 100 B P (MC 2264).

8. Respectively 3710 ± 90 BP (MC 2261) and 3690 ± 90 BP (MC 2262).

9. K-2797: 3980 ± 80 B P.

10. Two shards with applique snakes were found at Wadi Bahla BB 15 (Humphries 1974: fig. 10a, b) and a date in the 3rd millennium was suggested (ibid.: 51). Although such snakes with impressed circles decoration are found at Tepe Yahya IVB (Lamberg-Karlovsky and Tosi 1973: fig. 113), the items of BB 15 are better related to the Iron Age, on the basis of unpublished material from al Qusais displayed at the Dubai Museum. Such a date agrees very well with all the other shards found at BB 15.

11. The same use of grave-lining stones for a settlement building can also be seen on a sounding recently made for the Department of Antiquities of the Emirate of Abu Dhabi at Umm an-Nar.

12. 3520 ± 90 BP (MC 2259).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

42

Sheila Weiner

Hypotheses regarding the Development and Chronology of the Art of the Indus Valley Civilization

The revolution that the discovery of the Indus Civilization created with regard to our understanding of the antecedents of civilization in India is readily comprehensible when we realize that the contemporary view of Indian origins then rested upon the somewhat legendary history formulated in the *Rigveda*. For art historians, for whom Indian art began with the Mauryas, the Indus Civilization was most puzzling. Aside from the sophisticated decorative schemes and the remarkable sense of form evident on the seals, human figurines of stone, terracotta and copper were found among the ruins that, in the South Asian context, could only be matched by extant art that began to appear at the time of Asoka, in the 3rd century B.C.

Inevitably, attempts to unravel questions concerning the roots and sources of the Indus Civilization were cast for the next forty years in the contexts of the great city states of Mesopotamia. The 'mature' Harappan phase was dated according to current views of Sumerian development and chronology. The discovery of several Indus type seals in Mesopotamia,in contexts datable to the mid-to late third millennium B.C. justified the association (Gadd 1932). As a result, the period between 2500 and 1500 B.C. was generally accepted as the time-span of the Indus Civilization (Wheeler 1968: 5, 135).

Recent excavations in Turkmenistan, on the Iranian plateau, in Afghanistan, Pakistan and India, during the past ten to fifteen years, and refinements in radiocarbon dating suggest a different perspective. The results point to an entire new world of interacting civilizations that previously were just barely known to have existed. In time they appear to stretch back to the fourth millennium B.C. and, at one time or another, may have been links in a chain that extended from Mesopotamia and Turkmenistan to the Greater Indus Valley **(fig. 42.1)**.

In 1973, George Dales offered a revised chronology of this ancient world based upon: *(A)* a synthesis of cultural assemblages revealed by the recent excavations; and *(B)* refinements in radiocarbon dating predicated upon established dendrochronological dates that extended the previously proposed time-span for radiocarbon dates of the pre-Christian eras (Ralph 1971: 25-29). Dales posited the existence of land contacts from Turkmenistan through Seistan, across northern Baluchistan to the upper and middle Indus regions during the late fourth and early third millennium B.C. based upon adjusted radiocarbon dates, using a half-life of 5730 (Dales 1973: 164-68).

In 1975, Tosi, who had been excavating in Seistan, and Lamberg-Karlovsky, who had been excavating at Tepe Yahya on the Iranian plateau, synthesized what was known about the cultural complexes ranging from Mesopotamia and Turkmenistan to northern Afghanistan. They outlined a series of regional contacts and trade routes that stretched in geographic and chronological stages from theTigris-Euphrates to the Indus from the fourth to the second millennium B.C. (Lamberg-Karlovsky and Tosi 1973: 65).

Building upon the work of Dales, Tosi, Lamberg-Karlovsky and others, it now seems possible to sort some of the puzzling aspects of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

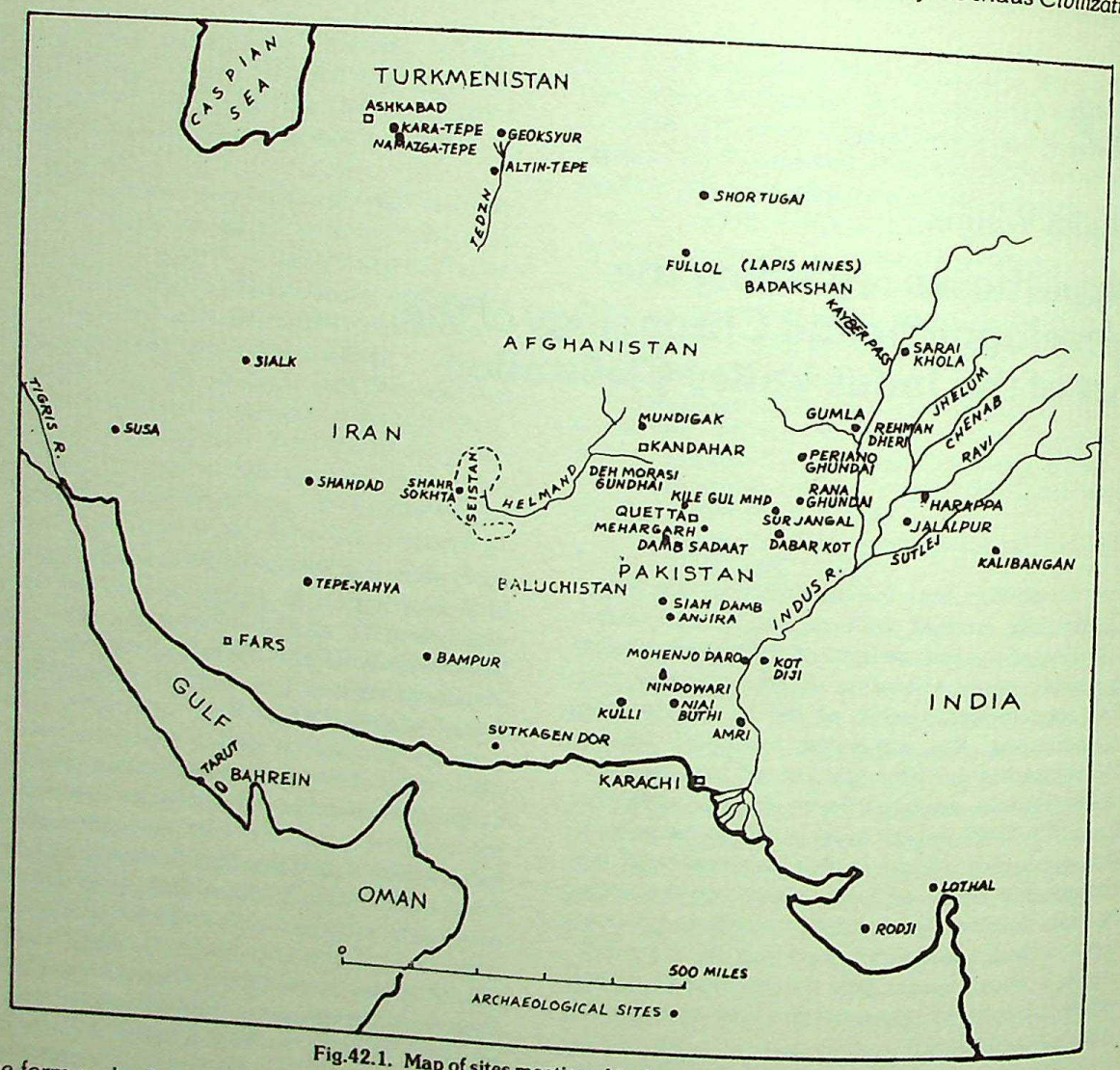


Fig.42.1. Map of sites mentioned in the next

the form and subject matter of art associated with the development of the Greater Indus Civilization.

Turkmenistan and The Indus Civilization

Masson and Sarianidi (1972), Frumkin (1970) Gupta (1979) have commented upon the similarities between the Namazga culture of Turkmenistan and Harappa. The evidence suggests that, beginning with the early phases of its development, the Indus Valley Civilization and particularly the region around Harappa, was in principal contact with south Turkmenistan. At the end of the fourth millennium B.C., the Turkmenistan culture was divided into two zones: that of the Kopet Dagh region to the west, and that of the Geoksyur oasis in the Tedzen Delta to the east. It is thought that the shifting of the rivers of the Tedzen Delta is what subsequently may have led to emigration from the area, and the settlement to the south of Shahr-i Sokhta (Hlopin 1974). The Shahr-i Sokhta settlement in Seistan (in the Helmand River Valley), seems to have served as a transmission point along the land routes between east and west.

Shahr-i Sokhta I is datable to 3200-2800 B.C. on the basis of its affinities to the Namazga III culture of south Turkmenistan and a single radiocarbon determination (4700 ± 220) from the site (Biscione 1973: 111). The same cultural horizon evident in Shahr-i Sokhta I is in turn found in Mundigak III. Located in south-western Afghanistan, Mundigak is about 40 kilometres

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

north-east of the point at which the Arghandab and Helmand rivers meet. Finds belonging to successive periods at Shahr-i Sokhta and Mundigak point to a continued cultural identity of the two sites in relation to one another.

The same cultural horizon seems to have extended east as far as Gumla in northern Baluchistan, and south and east to Jalilpur near Harappa. Lamberg-Karlovsky and Tosi (1973: 25-26) noted:

> Chess-board stepped triangle patterns painted on buff ware, together with certain distinctive shapes (hemispherical bowls, oval jars) and clay, bent-body anthropomorphic figurines are some of the most striking features shared over this wide area (of southern Turkmenistan, Seistan, the Helmand, and Quetta valleys, northern Baluchistan and the upper part of the Indus flood plain).

Trade Patterns

Black/red-on-grey wares, unknown in Turkmenistan, have been found in association with Namazga III ceramics in the Helmand and Quetta valleys, and in particularly large numbers at Shahr-i Sokhta and Quetta. This pottery type and the more recently discovered shards of streak-burnished grey ware at Shahr-i Sokhta are paralleled in IVC and IVB levels at Tepe Yahya in south-eastern Iran. A proto-Elamite tablet, sealings and seals were also recently found at Shahr-i Sokhta in a Period I context (Amiet and Tosi 1978: 22-24). In other respects, however, the cultural assemblages of the Seistan—Baluchistan and the Tepe Yahya regions are different. The lack of any evidence of direct contact between Turkmenistan and Tepe Yahya suggests that Shahr-i Sokhta. Shahr-i Sokhta, however, suging the needs of Turkmenistan or of minerally poor Mesopotamia. The trade in lapis lazuli provides a good example (Lamberg-Karlovsky and Tosi 1973: 39-40).

Lapis is mined in the southern part of Badakshan, in north-east Afghanistan (Herrmann 1968). From there it was passed to sites such as Shahr-i Sokhta at Shahr-i Sokhta, however,suggests that the site most probably served as a transfer point for the lapis to be sent to other regions (Lamberg-Karlovsky and Tosi 1973: 46 and 50-51).

The 'Harappan' finds of la Delegation Archeologique Francaise in 1975 at Shortugai, and the remarkable find of gold and silver vessels known as the Fullol of Khosh Tapa hoard in Badakshan in 1966 (Tosi and Wardak 1972, and Dupree 1971) support the evidence in favour of the existence of regional trade centres and transfer points that serviced the long distance trade between the Indus and points north and west during the third millennium B.C. Close to the Russian border, Shortugai is located on the Afghan plain, bound by the Oxus River and the Hindu Kush mountains, in proximity to routes east to Badakshan, south-east to the Indus regions, south-west to Baluchistan, and west to Turkmenistan.

In his preliminary report on the discovery of the site, Lyonnet (1977) hypothesized that Shortugai constituted a commercial and agricultural outpost of the Harappans. The 1976 excavations supported and enriched his tentative conclusions. Metal and lapis lazuli workshops were found among the ruins, and the ceramic finds of Shortugai I correspond to those of the Indus Civilization. Like many Harappan sites, the complex was divided into separate residential and work areas. No evidence, however,of a citadel, central monument, temple or figurines was found in the Shortugai I assemblage. This led Francfort and Pottier (1978) and Gupta (1979: 258-260) also to suggest that the settlement may have been developed as a commercial and agricultural outpost.

Francfort and Pottier also noted that the Shortugai I assemblage corresponds closely (except for the absence of figurines at Shortugai) to what was found at Gumla, a site in Pakistan near the Gomal Pass, which allowed access to the Indus plain from the Mundigak-Kandahar-Ghazni region. Pointed Indus goblets and straight walled tumblers were not found either in Shortugai I or Gumla. The chronology of the Indus Valley settlements in relation to the civilization as a whole, however, is still uncertain. Possibly, the pointed goblets and straight walled tumblers, as Francfort and Pottier (1978: 54-59) suggest, are innovations that post-date Shortugai I and Gumla, and/or — less probably — were a part of the Indus Civilization assemblage that did not extend to some of its distant outposts.

Because of the location of Shortugai I and Gumla,and the artifacts found at each site, it seems reasonable to assume that Shortugai I and Gumla played a role in any contemporary connection that might have existed between the Indus regions and Turkmenistan (Gupta 1979: 260). In this context, the figurines found at Gumla and the vessels of the Fullol hoard, discus-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

sed below, are particularly significant.

Clay Figurines

The evidence at hand suggests that the earliest traces of a sculptural tradition related to the art of the Indus Civilization are found between Turkmenistan and Harappa. Its characteristics seem apparent as early as the late fourth millennium B.C. along the route that is thought to have run from Turkmenistan to Seistan and Mundigak, and into Baluchistan—skirting the principal mountain ranges—via either the Bolan or Mula Passes, or through the Gomal Pass, into the Indus plains.

183 The Turkmenistan female figure type is one that evolved gradually during the fourth millennium B.C., from the Namazga I period through
184 Namazga III. The more recent the figure, the more schematized or abstract it seems. Placed side by side with figurines of the earlier period,
185 the later figurines from the Namazga III complex appear more abstract.

Probable successors to and close in style to the most schematized of the Namazga III figurines, are the figurines found at Gumla near the Gomal Pass, one of the principal passes—as indicated above —from the north and west in to the Indus
186 regions. The figurines belong to the Gumla II period which dates from the early to mid-third millennium B.C. (Dani 1970-71: 179). Compared to the Namazga III figurines, the Gumla II images and those of successive periods (Dani 1970-71,
187 pl. 22b) evince an even further abstraction of anatomical forms, and a tighter outline. They lack the elasticity and lively quality of the Namazga III figures.

The figurines are all considered to be fertility figures. A recent find of the Department of Archaeology in Pakistan suggests a possible explanation for the extraordinary, somewhat steatopygous shape, and extremely abstract form of the figurines. In the course of its 1977 explora-
188 tions, the Department found a miniature terracotta plow at Jawaiwala, a Mature Harappan site in Bahawalpur. If we compare the shape of
190 the miniature plow and to (an old plow from
189 Turkestan) that of the limbs and torso of Namazga III and Gumla II figurines, the similarities are striking and the conceptual relationship between the form of the female figurines and the shape of the plow seem evident. The plow and the female form—without arms or head—suggestively combine to form visual and anthropomorphized fertility symbols.

A comparatively full bodied figurine of the Namazga III period, the geometric images from Gumla II, and seated figures from Harappa (Vats 1940: pl. LXXVI, 8-10), seem to represent chronological and regional variations on the same theme. In the following periods the style changed. Namazga IV and Gumla III-IV images are closely akin to a figure in the Boston Museum of Fine Arts from Sari Dheri, just south of the Khyber Pass (fig. 42.8 A & B), and to figures 191
found at Rehman Dheri (a site near Gumla currently being excavated under the direction of Professor F.A. Durrani of the University of Peshawar), at Sarai Khola II (Halim 1972, pl. X b), and Jalilpur II (Mughal 1972, Pl. XXVII 8-10), as well as Harappa (Wheeler 1947, pl. LVI 1-6). Jalilpur is just 77 km south-west of Harappa.

Figurines from Namazga IV-V levels, and 192
Mundigak IV levels (Casal 1961, pl. XLI) ended just at or below the pubic triangle. The torsos were almost totally flattened, and the narrow waists, geometrically articulated breasts, and the broad hips accentuated. The breasts and facial features, except for the nose, were often applied rather than modelled. The eyes were inserted as flat round discs, and the mouth was frequently incised. The countenance was most often like that of a bird. Increasingly greater attention was given to details of head-dress, hair and body ornamentation, all of which were applied or incised rather than painted as they might have been in an earlier period. In fact, the incised dec-
oration is varied and in the Namazga V period 193
often appear to have symbolic significance (Masson and Sarianidi 1972: 129-36).

Clearly identifiable male figures are rare in Turkmenistan, and in Gumla none were found. At Harappa they are greatly outnumbered by female figures (Vats 1940: 292). A Namazga III
194 figure, called the 'Priest', by Masson and Sarianidi, is cylindrical from the chest down, except for the bottom which flares to form a base. The head has a bird or animal-like countenance with slit eyes, undifferentiated nose, and no chin. Just below the head is what appears to be a double tufted beard held by a collar at the base of the 'Priest's' long neck. On the back of his head is a round crown from which a streamer or plait of hair descends. Many similar and more highly

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

developed heads, often of indeterminate sex, have been found in the Geoksyur region. They are characterized by thick lips or an incised mouth, long beaked noses, almond shaped eyes and elongated, slanted eyebrows (Masson and Sarianidi 1972, fig. 23h).

195 The best preserved male head of the Namazga III period is the so-called 'Warrior' from Kara-tepe. It, and others, of its type, which may or may not be bearded, are distinguished by their head-dress, which resembles a helmet that ends in loop-shaped cheek pieces. Masson and Sarianidi (1972:88) commented that the heads of the warriors have no equivalents anywhere else in the ancient Near East. 'Having appeared here in Turkmenistan in the first half of the third millennium B.C. they soon disappeared, and did not recur after the Namazga III period'.

The 'Warrior' type, however, was current in Harappa, and was also found at Mohenjo-daro. At Harappa it shared, aside from the usual characteristics of the head, which in this instance is bearded, other aspects of the Turkmenistan figurines; notably, the seated posture with legs
196 extended forward and the numerous hemispherical bosses applied to the body as ornaments. A comparison of examples from the myriad of
197 Namazga III whole and fragmentary terracotta figurines with broad shoulders ornamented by hemispherical bosses with the Harappan 'warrior' the well-known Harappan male torso in stone, and other male figures from Harappa suggests antecedents for the puzzling pellets on the Harappan figures' shoulders (Vats 1940, pl. LXXVI. 11, 20).

The bosses tend to obscure the sex of the image. They are often placed high on the chest, which make it difficult to determine whether a figure is male or female. It seems possible, however, to sexually differentiate images by width and slope of the shoulders. The shoulders of distinctly female figures appear narrow and tapered, those of male statuettes straight and broad. The difference becomes evident if we contrast, for example, the Kara-tepe 'Priest' with a female figure from the same site. In contrast to the diminutive proportions and curvilinear aspects of the Namazga III female figurines, the proportions of the apparently masculine Namazga and Geoksyur statuettes are weighty, square and broad. That bosses on the chest are associated with male figures is clearly indicated by the very recently published distinctly male and female figures from Period VII, *c.* 2700-2600 B.C. Mehrgarh, a site at the foot of the Bolan Pass (Jarrige and Meadow 1980).

Several new figure types appear during the late Namazga III period and in the context of Namazga IV. An isolated group of sporadic miniature figures with outspread and sometimes bent legs without any indication of sex (Masson and Sarianidi 1972: 10), and another group of zoomorphic images in similar posture occurred in Namazga III layers (Masson and Masson 1959: 21). The zoomorphic representations tend, in contrast to the human figurines, to continue to be three dimensional in successive periods.

About the same time as the earliest of the distinctly figures (Namazga III), a few full-bodied images appear, particularly at Altin-tepe. The arms and hands of full figures are usually folded against the abdomen or engaged in clutching a child or animal to the chest (Masson ad Sarianidi 1972: 87).In Namazga IV-V levels, Masson and Sarianidi noted male figures with exaggerated sexual organs (Masson 1968; 182; pl. XXVII b). At Namazga-tepe and Altin-tepe two figures of a type otherwise unknown in Turkmenistan occur in a Namazga IV context. Each has one arm pendent and the other bent at the elbow and raised with its hand to face (Masson and Sarianidi 1972: 108).

Although stylistically variant, the development of figurines at Mehrgarh seems to have followed a similar pattern. During Period VI, *c.* 3000-2700 B.C., female figurines were still portrayed in seated position, but the hair styles become more elaborate and fantastic, and the ankles were encircled by a coil of clay (Jarrige 1976, fig. 5). In Period VII, *c.* 2700-2600 B.C. the figures stand.

> Male figures now appear at Mehrgarh in significant numbers for the first time; they account for about 30 per cent of the figures identifiable by sex. ... The male figures have a large turban and a neck-tie-shaped pendant. By the end of Period VII the poses have become stiffer and the figurines are modelled in the rather stereo-type manner characteristic of those found at many other sites in Baluchistan and neighbouring agreas (Jarrige and Meadow 1980: 133; Jarrige 1976: 86-91).

Each of the figural types of the Namazga III and IV periods, and Mehrgarh VII is paralleled by numerous examples at Harappa (Vats 1940, pl. LXXVI-LXXVII). Before the end of Namazga III and Mehrgarh VII, the rare occurrence in Turk-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

menistan or Baluchistan of distinctly male Images would tend to indicate that they were either not as significant in the cultural configuration as female figures and/or that possibly they and those of indeterminate sex represent an adaptation[1] of a foreign element, possibly Harappan, into the culture.

The succession of levels in which different types of figurines were found in Turkmenistan, Gumla, Mehrgarh, and related sites enables us to: (1) chronologically order the stylistic development of images and establish the position of Harappan figures with that progression, (2) to date specific groups of images in a relative order to the period between the late fourth and mid-third millennium B.C., and (3) recognize thematic parallels among regions.

Cultural Parallels

The chronological order of early settlement patterns and trade routes during the late fourth and early third millennium B.C., suggested by Dales, Lamberg-Karlovsky and Tosi continues to coincide with the relationships suggested by persistent cultural parallels between Turkmenistan and the Harappan regions. In successive periods, however, the main thrust of influences seems to have shifted direction, and the impact of development in the east is echoed, if not directly experienced, in the cultural complexes of southern Turkmenistan, particularly in the Tedzen Delta region. The occurrence of male images in the late Namazga III context is possibly one of earliest indications of the incursion of influences from the east. At about that same time—the early third millennium B.C., soon thereafter, lapis lazuli from Badakshan, models of clay-carts drawn by camels of the sort so well known from the Indus regions, new pottery forms, and clay, stone, and (Later) bronze seals with geometric designs appear in Turkmenistan.

Birds, animals, geometric and anthropomorphic shapes with arms often raised in spread-eagle fashion, combined with stars, crosses, and 'T's constituted the principal elements in the decorative scheme of Namazga III pottery. A different decorative scheme and intrusive shapes, derived from the east, transformed the pottery. The bold rhythmic designs and zoomorphic themes of Namazga III pottery gave way to a refined linear patterning of deer, stepped pyramids, triangles, and lozenges. Emphasis shifted from the horizontal bowl to the vertical vase. The ornamentation of the Geoksyur, or Namazga III-V pottery of the Tedzen Delta became emphatically geometric. The same change seems to have occurred at Mehrgarh during Period IV, *c.* 3500-3200 B.C (Jarrige and Meadow 1980: 128 and 130). Nonetheless, the geometric patterns of the Namazga III-IV pottery remained highly charged. The same configurations of Mundigak III and Shahr-i Soktha I lack the nervous vitality and totemic impact of the Turkmenistan specimens (Biscione 1973: 111, Figs. 8.6 and 8.9

During the successive period, the culture of each of these regions concurrently changed. The late fourth and early third millennia were a prosperous period for Tukmenistan, northern Seistan, Mundigak, northern Baluchistan and the greater northern Indus region. In Turkmenistan and Mundigak, the impact of the elegant Kechi Beg pottery style from the Quetta valley is recognizable, and numerous other artefacts of Mundigak III and Namazga III-IV reveal an affinity with Dam Sadaat II-III (Fairservis 1975: 141-45). From Turkmenistan to Harappa what seem to be mutually intelligible potters' marks appear on the ceramic ware of each of the northern sites (Masson and Sarianidi 1972: 134-35 and Sarianidi 1977: 160-68). The excavations at Shortugai suggest that the settlement was established to service a far- flung trade in metals and lapis lazuli (at Mehrgarh lapis beads occurred in period III 4000-3500 B.C.) prior to the mature Harappan period (Jarrige and Meadow 1980: 130; Gupta 1979 II: 258). Other settlements increased in size, and the earliest monumental architecture concurrently appeared at Altin-tepe, Mundigak and Harappa. Cultural parallels that existed during Shahr-i Sokhta I and Mundigak III persisted. 'Thousands of potsherds of Periods II and III at Shahr-i Sokhta bear witness to a cultural identity with Mundigak IV 1-2,the same is true for the lithic industry,metal working, building techniques, brick typometry, figurines and seals (Lamberg - Karlovsky and Tosi 1973: 65). Development during Mehrgarh VI to VII appear comparable (Jarrige 1976: 85-89).

The sequence at Mehrgarh is long. At other sites it is shorter or interrupted,but as Jarriage and Meadow (1980: 133)commented:

> The sequence reveals a process of continuing elaboration that affected cereal cultivation, animal husbandry, crafts,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

architecture and even ideology. Step by step one can see the stage being set for the development of the complex cultural patterns that became manifest in the great cities of the Indus Civilization in the middle of the third millennium B.C.

Iran, Msopotamia, And The Indus Civilization

During the early third millennium B.C., there seems to have been a gradual infusion to the east of currents from Mesopotamia and Iran. A new cultural thrust is indicated in the formation of the southern Indus sites that sets them apart from those of earlier periods in the north. To the north, pottery types allied to Tepe Yahya appear in Seistan, and a new mode related to the contemporary art of the Tigris-Euphrates region, Susa and the Iranian plateau is evident at Mundigak IV and Mehrgarh VII, as well as Mohenjo-daro. The admixture of elements in the Fullol hoard and the character of the two well-known stone figures from Harappa, the male torso and the 'dancer' also suggest the incursion of new elements affecting the development of the art of the evolving Indus Civilization.

Among the gold and silver vessels of the Fullol hoard — found less than 100 miles (160 km) from the lapis lazuli mines of Badakshan and the 'Harappan' outpost of Shortugai — are metallic versions of the geometrically painted ceramic wares of south Turkmenistan, Seistan and the Kandahar region. The same stepped pyramids, triangles and crosses that adorn the painted wares of Namazga III-IV, Shahr-i Sokhta II, Mundigak IV and Deh Morasi II appear on three of the seventeen incised and embossed fragmentary gold and silver vessels in the Fullol hoard (Dupree *et al* 1971: 30-34, figs. 6 and 10).

The decorative scheme of a group of fragments in the hoard, adorned with animals, suggests a relationship with Harappan seals on the one hand, and an affinity to styles current in Iran and Mesopotamia on the other. In the group is a large gold goblet decorated with two boars separated by a tree. A border of hemispheres encircled the top of the vessel, and a continuous chain of cones outlined the bottom. Multiple cones form a mound beneath the tree. The animals are shown in profile, and the haunches of the boars, and of bulls on another gold vessel, are articulated in a heart shaped form. Chevrons outline the shoulders of bulls on a silver vessel. The ground is indicated by a continuous chain of bosses, and the bulls face an object that closely resembles the unidentifiable and puzzling stand that appears in front of so many of the animals, particularly unicorns, on Harappan and Mohenjo-daro seals.

A fragment of a gold beaker with undulating vipers, and a bird in profile evoke the ceramic goblet found in the earliest installation at Susa (Tosi and Wardak 1972, fig. 13). The bulls with haunches outlined by chevrons, on a gold vessel, are bearded and anthropomorphic; the rendering of the beards, the hair on the forehead, and the curls along the ridge of the backs (Tosi and Wardak 1972, fig. 2 A and 16), correspond to the treatment of the hair of a small 'Proto-Elamite or Sumerian' silver, gilt-faced hilly goat from Iran dated 3000-2500 B.C. in the Boston Museum of Fine Arts. As Tosi and Wardak (1972: 14) commented with regard to the mixture of elements in the Fullol Hoard, 'we are up against a remarkable convergence of features that can only be explained in a wider context'.

Stone Figurines

The extraordinary qualities of the two well-known Harappan stone images, the red stone male torso and the black stone 'dancer' have long puzzled scholars. As Vats (1940: 75) noted, no stone is found in the area. The material for each of these figures, as well as other objects made of stone at Harappa had, therefore, to be imported. The various socket holes that appear on the figures are also unusual. No other images in the region were made the same way. 201 202

Even the sex of the 'dancer' is in doubt. The 'dancer' has generally been considered male because of the socket high on the left thigh, just-below the pelvis, which is thought to have held a penis. John Marshall and later writers such as Rowland (1954: 16) and Sankalia (1978: 24-25) have even suggested that the figure was ithyphallic. As far as I know, only Fairservis (1975: 283) refers to the figure as feminine, and Marshall (1931: 46), who was the first to describe it and considered it male, noted that its contours are 'soft and effeminate'. If we compare the 'dancer' to other female figures from Harappa and Mohenjo-daro, (Vats 1940, XXVII/51 and 52; Marshall 1931, pl. XCIV/5, 9), it seems equally plausible to assume that the socket might have supported a girdle or other ornament that encircled the loins; for, in fact, there is another socket on the outer side of the right thigh.

The feminine aspects of the 'dancer' become

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

even more apparent if we contrast the figure with the compact rotund quality of the Harappan male torso in stone. The narrow shoulders of the 'dancer' its high and small breasts (with inlaid nipples of stone in cement), the slender waist, the proportionately broad and full hips, and elongated and low buttocks are most suggestive of the youthful form of an adolescent girl.

The Harappa torso and 'dancer' appear on the one hand to relate to the sequence of figural types that evolved during the late fourth and early third millennia in the regions between Tukmenistan and Harappa. On the other hand they elicit distinctive traits that set them apart from the Namazga III, Gumla II, Mehrgarh VI-VII and other Harappan figures. The Harappan stone images are composite figures; each has drilled socket (s) on its neck and beneath its truncated limbs for insertion of the missing head or limbs. In each case the division of the pectoral muscles is decisively delineated, and finally each is in stone, and no other human figurines in stone were found at Harappa.

These distiguishing characteristics, as well as the exceptional torsion evident in the Harappa 'dancer' correspond, however, to the features *198* and qualities of a crystalline limestone lion *199* demon in the Brooklyn Museum dated to the Susa C, proto-Elamite period, c. 2900-3000 B.C. Porada (1950: 225-26)—and later Amiet (1966: 105) base dating and provenance of the figure upon comparable images that appear on proto-Elamite seals from Susa C.

> The lion demon stands in upright human posture. The lower part of the body is turned at right anges from the thorax so that the legs and abdomen face in the same direction as the head . . . The legs are cut off above the knee and the stumps are smoothed off. One stump bears a dowel hole, suggesting that the lower legs were made separately . . . The view of the back shows two holes in the neck and four at the base of spine, meant for the attachment of a mane and tail respectively (Porada 1950: 223).

The anatomical and powerful conception of the human form realized in the lion demon and the two stone figures from Harappa tends to bely their miniature size. The lion demon is 8.4 centimetres high, the 'dancer' is 10 centimetres and the male torso, 9 centimetres.

The angle of the head socket on the Harappa 'dancer' suggests that the head, like that of the lion may have been at right angles to the chest. The four socket holes on the neck were perhaps also intended to hold a mane, hair or headdress, and possibly the sockets in the humeri of the 'dancer' were fitted with arms comparable to those of the lion—bent at the elbow and joined by locked paws in front of the chest.

The modelling of each of the three stone figures partakes of a similar planar quality. Front, side and rear do not flow one into the other. From each angle a distinct boundary delimits the image. In each instance the breasts are clearly outlined and the median division emphasized. Each part of the torso is differentiated from the other: the breasts from the abdomen, the abdomen from the pelvis, and the pelvis from the legs.

As Porada and Amiet indicated, the lion demon fits into the larger figurative context of early 3rd millennium Susa. The 'dancer' and torso, however, are each unique in the Harappan context. Although they conform in part to a general pattern of sculptural development evident in Turkmenistan, Seistan and Baluchistan during the late fourth and early third millennia, the most extraordinary facets of their character link the stone figures more closely to the proto-Elamite context. This association is understandable in the light of what is known about the historical pattern to trade relations in the greater region. In the fourth millennium, there was more lapis lazuli from Badakshan in northern Iran and Mesopotamia than in the south. During the proto-Elamite period, however, Susa gained control of the trade in lapis, and Sialk IV was established as a trading outpost for Susa. The ties between Susa C and Sialk IV are very close. During Early Dynasty (hereafter abbreviated ED) I, however, the trade was interrupted, but restored during ED. II, (Herrmann 1968: 36-39).

A late fourth or early third millennium date for the two Harappan figures based upon the archaeological context in which they were found is plausible, although the evidence is, at best, tenuous. The site of Harappa was disturbed for its bricks prior to its excavation. The stratigraphy, therefore, is not totally reliable. Vats (1940: 22 and 74-75), who excavated the site, reports that the 'dancer' and torso were found in mound F; the 'dancer' in a stratum that he tentatively dates to c. 3500-3050 B.C. and the torso in a stratum assigned to c. 3050-2750 B.C. The earlier stratum of mound F, in which the 'dancer' was found. Vats considered earlier than Mohenjo-daro. Tiny seals and sealings of a type not found at Mohenjo-daro appeared in that stratum, includ-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ing three with just the stand, which in higher levels at Harappa and Mohenjo-daro, is associated with representations of the unicorn (Vats 1940: 321-22). Vats' relative dating of the different strata in which the 'dancer' and torso were found is consistent with the differences between the two figures and their possible affinity to the Namazga culture, on the one hand, and to Susa C (Level 17), on the other. The'dancer' relates to the female figures of Namazga III and Gumla II, the torso to male images of Namazga III-IV
200 (Geoksyur I), and both relate to the imagery associated with Susa C.

In addition to the interaction suggested by sculptural similarities between Harappa and Susa C, a unique steatite seal found in the lower levels at Harappa proposes contact with Tepe Yahya IV B, dated c.3000-2500 B.C. by Lamberg-Karlovsky (1970: 34 and 81). The seal is rhomboid with undulating edges. On one side is a cross and on the other an anthropomorphic eagle with out-streatched wing that resemble arms. Above each of these projections is a snake. The seal is the only such object found in the Indus regions (Vats 1940: 324), but it bears a very close resemblance to the eagle on each face of a steatite shaft-hole axe from Tepe Yahya IV B (Lamberg-Karlovsky 1970, pl. 19a fig. 22b), and from the description, an uncanny resemblance to an eagle incised on a steatite 'ash tray', also from Tepe Yahya IVB, which Lamberg-Karlovsky describes as 'an eagle with spread wings, wearing a pleated skirt, belt, and V-type necklace,' similar to the eagles on the shaft-hole axe 'but of finer workmanship and more elaborate'. The 'ash tray' or 'dish' was found in the lowest architectural context of Yahya IVB (Lamberg-Karlovsky 1970: 47,67).

The evidence suggesting contact between Harappa in the east,and Susa and Yahya in the west, appears to be confined to the late fourth and/or early third millennium. This can be judged by the dates for proto-Elamite Susa C, Tepe Yahya IVB, and the inferences that can be drawn from the archaeological and varied stylistic affinities of Harappan and Fullol hoard objects. The interruption of the trade in lapis lazuli between Badakshan and Mesopotamia during E.D. I may account for the lack of any further or continued evidence of contact between Susa and Harappa. Contact between the northern Harappan cultural regions and Tukmenistan, however, was maintained at least until 2500 B.C. Several sites in the region were abandoned—Sarai Khola and Jalilpur, permanently; Gumla and Kalibangan, temporarily. However, archaeological evidence from Altin-tepe in Turkmenistan where a Harappan seal was found in a Namazga V context and the persistence of similarities among figurines and tools, and continued trade in lapis lazuli indicate an on-going, if diminished, interaction among the northern regions (Gupta 1979 II: 168-70 and 282-83). The proto-Elamite contact with Harappa, however, was brief.

Contacts between the lower Indus regions and other areas seem to have followed a different course. The composite and plastic character of the six rather 'monstrous' stone and incrusted images from the Fars region, discussed by Ghirsh- 203
man (1963: 151-60), Nagel (1968: 99-136), and others (Porada 19-71: 328-29), may link and span a gap between the lion demon of the Susa C period and the figurative art of Mohenjo-daro. The lion demon and the Fars figures derive from a common Elamite sculptural tradition. Each of the Fars figures is an aggregate of contrasting materials: dark and light stones, gold, iron, shell and paste. The parts are connected by tendons and sockets. The torsos and limbs are all heavy, round and sectionally delineated. All appear monumental, although each stands—or would if intact—no more than 12 centimetres high.

The Fars figures have been dated as a group, on the basis of style and provenance to the end of the fourth or beginning of the third millennium B.C. (Nagel 1968: 115). The dates seem too early and too late for the group as a whole. Like the Brooklyn Museum lion demon, and associated seal figures from Susa C, two of the six are more demonic than human: the Berlin 'Stiermensch' or 'bullman', and the Berlin bust. The eyes are round, the visages flat, and the hair sculpted like a mane. The ears are high, small and protruding (Nagel 1968, pl. XVIII/3 and XXII/ 1, 2). Except for the 'bullman', each of the figures has a deep disfiguring gash that runs diagonally from the centre of the brow, along the nose, to the beard.

Only the bodies of the 'bullman' and Foroughi bust are smooth, although the 'bullman' is probably the oldest and the Foroughi bust the most modern of the group (Nagel 1968, pl. XXII/3). The body surfaces, arms, and legs of the other four figures—the Berlin bust, and the standing Azizbeghiou (Nagel 1968, pl. XVIII/1 and 2).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Foroughi (Nagel 1968, pl.XIX), and the Louvre figures from which the feet are, in each instance, missing — are scaly.

The three best preserved of the scaly figures have a skirt of contrasting colour and stone a yellowish chalkstone or alabaster, inlaid with gold and colored stone. The Louvre figure and the Berlin bust display remnants of a diadem inlaid with iron, and all six have a hole or tenon at the top of the head for attaching a headdress. Only the Foroughi standing figure retains its headdress which resembles a top hat.

Except for the 'bullman', space exists between the arms and body of each figure, and between the legs of the standing figures. Tucked between the chest and bent left elbow of all but the 'bullman' is or was a round drum-like object, or in the case of the Foroughi bust, a rectangular box-like object.

Among the six sculptures, the 'bullman' is the most distinct, but the fullness of its forms, its strong round limbs, and its composite character ally it with the others. The body is carved in a block from a hard grey stone. The figure is closed and columnar. Its arms and legs are part of an unbroken mass. The prominent and exaggerated genitalia were carved separately of chalkstone, and inserted into a cavity between the legs—from the pelvis to the flaring hoof-like feet—in a way that does not disturb the columnar quality of the figure.

The definition of the rounded forms of the 'bullman' is dependent upon or augmented by linear patterning: the outline of the facial features, the head and long and incised beard, the game-board stylization of the pectoral muscles, the distinctions between limbs and body, and the flat inset genetalia. The whole figure, as well as each of its parts, is tautly outlined. Stylistically, the 'bullman' relates to (1) a seated stone figure from Mohenjo-daro that is similarly sculpted, and (2) to a group of sculptures found by Mecquenem in 1909 and 1914 in the basement of the temple of Nin-Hursag on the acropolis at Susa that may, as indicated by Amiet (1976: 52-53 and 63), pre-date the proto-Elamite period.

The face of the Mohenjo-daro figure has the same flat grotesque features, with deep round eyes and open mouth as the 'bullman'. The body is schematically divided and the fingers of the hands cursorily articulated like those of the 'bullman'. (Marshall 1931: 360, pl. c/4-6). The Mohenjo-daro figure, the early figures in the Susa group, and the 'bullman' are all carved rather than modelled, and comprised of separate parts schematically integrated and incised.

The Susa group includes a statuette of a seated devotee with clasped hands and severe facial features (Amiet 1966, fig. 46; 1976, pl. XIX-5/10), a sculpture of a shaven head (Amiet 1976; 62, pl. XVIII/3, 4), as well as a fragmentary bearded head (Amiet 1976: 61-63, pl. XVIII), found in 1974. The figures emerge on the surface from the solid mass of the stone. The definition of form is minimal and schematic. The outline of the brow, in each instance, flows into the nose, the oval chin or beard into the chest, and the torso of the seated figure into the undifferentiated lower limbs. A median line divides the pectoral muscles of the devotee, and his clasped hands create a horizontal linear pattern at the waist. The feet of the figure seem to emerge from the hemline of a garment. There is otherwise no indication that the figure is robed.

Conceptually, the demonic aspect of the 'bullman' allies it with the seated stone Mohenjo-daro figure, but at the same time sets it apart from the Susa figures. Amiet (1976: 63) associates the Susa sculptures with Susa level 17 and Uruk IV—the proto-literate period when a system of accounting existed that was 'virtually without writing' and cylinder seals first appeared. Citing LeBrun (1969-71: 209-10). Amiet points to a break between Susa levels 17 and 16, when writing appears and the true proto-Elamite period begins (Amiet 1979: 196-97).

Amiet (1979: 197) points out that during the proto-Elamite period (Susa levels 16 to 13), the style of seals 'breaks with the Susa tradition of the preceding period in introducing animal representations from which man is, so to speak, systematically excluded'. Susa's culture then differed from that of Mesopotamia and was more closely aligned with the civilization of the Iranian plateau, Sialk IV-2, Malyan in central Fars, and Tepe Yahya IVC. proto-Elamite trade contacts extended east certainly as far as Shahr-i Sokhta (Amiet 1979: 199-200; Lamberg-Karlovsky 1972: 222-230), and possibly—as suggested above—for a short time as far as Harappa.

During the late fourth and early third millennia B.C., settlement patterns and cultural development on the Iranian plateau appear to have been closely tied to the history of Susa, which again

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

became a Mesopotamian city during the E.D. II-III period. The impact of the dichotomous cultural currents, which alternated at Susa, is reflected in the composite stone sculptures from Fars. Although the figures all appear to derive from a common plastic tradition, the differences among them may be accounted for by an amalgam of the different representational traditions of Mesopotamia and the Iranian plateau.

The 'bullman' seems to stand on the threshold of the late Uruk-proto-Elamite period, to bridge Susa levels 17 and 16. It seems to represent a merger of the humanistic Mesopotamian and demonic eastern modes. During the proto-Elamite period anthropomorphic representations replace man. The Berlin bust from the Fars region, with its demonic gashed face, lateral ears, and scaly body surface, grossly exaggerates the combined characteristics of the 'bullman' and the devotee from the Susa acropolis group. The head and beard hang forward and low on the chest. The shoulder line is broad and squat, with boldly rounded musculature at the juncture of the shoulders and arms. The pectoral muscles are modelled, divided and powerful. The left arm of the figure bends in at the elbow and, at one time, held an object against its chest. The upper right arm — the lower portion is missing — hangs free of the body. In spite of its squat compact, compartmentalized character, the figure, when compared with the 'bullman', appears to be free and independent of the stone masses from which it was carved. Next to the Berlin bust (Nagel 1968, pl. XXII/1, 2: Ghirshman 1963, figs. 6-8), the shape and proportions of the Azizbeghlou (Nagel 1968, pl. XVIII/1, 2; Ghirshman 1963, figs. 4, 5), Foroughi (Nagel 1968, pl. XIX; Ghirshman 1963, figs. 9, 10), and Louvre figures, and the Foroughi bust (Nagel 1968, pl. XXII/3; Ghirshman, 1963, figs. 9, 10), appear progressively more human.

Porada noted similarities between the faces and beard of the scaly men and that of a head at the edge of a steatite fragment from Tarut. She also drew attention to the similarities that exist between the scaly men and a stratigraphically documented human torso from Tepe Yahya IVB (Lamberg-Karlovsky 1970, pl. 19C, fig. 22A:

> To these associations of the scaly men with objects of carved steatite might be added the human torso found at Tepe Yahya, which shares with the stylization of the men a stress on the linear divisions of the breast, a vertical line separating the two halves and a semi-circular line below each half. Furthermore, the broad shoulders, though incompletely preserved on the torso, nevertheless appear to have been similarly stressed, (Porada 1971: 328, pl. IV/15b).

In a different context, Miroschedji (1973: 22), called attention to the developed pectoral muscles that appear on the Tepe Yahya figure, on figures on the vase from Khafaje in the British Museum, on a vase from Tel Agrab, and on a steatite statuette and bitumen relief from Susa. The same convention is used in the portrayal of musicians and dancers on the fragmentary inlaid steatite vase from Bismaya, assigned to the E.D. I period (Frankfort 1977: 40, fig. 31). Seidl (1966: 201-2), in fact, associated the Bismaya figures with the scaly men from Fars.

The associated evidence thus suggests that the devotee and head from the MecQuenem group of the Susa sculptures, the head found at Susa in 1974, the 'bullman', and the lion demon in the Brooklyn Museum, as well as the Harappa stone figures and the Mohenjo-daro seated demonic image belong to the proto-literate or early proto-Elamite period. The scaly men, the Bismaya vase, the figures on the vase from Khafaje in the British Museum, the figures on the Tel Agrab vase, and the bust from Tepe Yahya IVB follow in time.

The demonic and anthropomorphic images of the proto-Elamite period appear to be rooted in an indigenous aggregate and composite Iranian sculptural tradition. The differences among the Fars figures suggests that, over time, the demonic aspects and composite character of the Iranian image were modified and shaped by the more humanistic and modulated conceptualizations of Mesopotamia. This most probably occurred during Yahya IVB and E.D.II, when the settlement at Yahya—as the evidence indicates—served primarily as a production centre for the trade in chlorite objects. The same time as when the trade in lapis lazuli between southern Mesopotamia and Afghanistan—interrupted during E.D.I—was resumed and routed via Sialk IV and Susa.

The relative date of the Fars figures is significant for the dating of the exceptional and well known 'Priest' from Mohenjo-daro, and related 204A figures. As Amiet (1976: 202) noted in a footnote, 'through the shape of their beards', these statuettes 'are related to the sculptures from Mohenjo-daro'. The association of the Fars men with the Tarut fragment and Tepe Yahya torso noted by Porada, and the anatomical traits that

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

they share with figures on the Bismaya, Khafaje and Tel Agrab vases, moreover, throw light upon the chronology of the relationship between the Indus Civilization, and the Iranian and mesopotamian world. Frankfort (1977: 383 6n. 40/2) alluded to an early third millennium B.C. relationship between the Mesopotamian and Indus regions in his comments upon the occurrence of the zebu or humped bull on the Tel Agrab and Khafaje vases. He noted that the zebu is not indigenous to Mesopotamia but appears regularly on seals from the Indus Valley. The multiple associations and similarities among objects chronologically clustered between *c.* 3000 B.C. and 2600 B.C., moreover, tend to bear out Oppenheim's view (1954: 14-15) as Porada (1971: 331) noted when discussing steatite objects—that direct trade from the east to Mesopotamia, in luxury goods, peaked in the early third millennium B.C.:

> The following picture of the history of the Eastern trade of Southern Mesopotamia can be deduced from the extant evidence. A process of gradual and slow restriction of the geographical horizon marks the entire development of these commercial connections. We may well assume that the frequency and intensity of contact had reached a peak early in the third millennium B.C. ... In the period documented by written sources (Old Babylonian) Meluhha (the Indus Civilization) is already outside the borderline of actual contact with Mesopotamia. ... This Ultima Thule is said to be the homeland of certain raw materials (copper, stone, timber)or the native habitat of a few plants and breeds of animals. This is not the case with Makkan (the Makran) and Telmun (Bahrein). Both countries continue to be mentioned in economic and other texts through the entire period of the rule of the Third Dynasty of Ur.

The 'Priest', three other stone heads from Mohenjo-daro (Marshall 1931, pl. XCIX)—one of yellow limestone, one from Dabar Kot (east of Quetta), and another from Mundigak (During-Caspers 1965, pl. XX, XXI)—share similar characteristics. The type is otherwise unknown among early Indian, Pakistani and Afghan sites. Stone, in fact, is rare throughout the Indus context.

204B The 'Priest' which is made of steatite is about 17 centimetres high. Indications of colour are visible within the clover-leaf pattern—which resembles the designs on figures of reclining bulls from the Uruk period — of the robe. According to Mackay (Marshall 1931: 351), the robe pattern *204C* 'appears to have been first shaped by means of a drill, for there is a shallow pitting in the middle of each foil and roundel suggesting the point of a drill; the pittings are much too central as well as too shallow to have served merely for keying purposes'. The interior of the clover-leaf or trefoil designs was left slightly roughened to allow red paste that was used as a filling to adhere. When discovered, the figure was covered with a smooth coating, like that on the Indus seals, which disappeared during cleaning.

A crisp, confining outline defines the features *205* of the head and face of each of the stone heads *206* from Mohenjo-daro, Dabar Kot and Mundigak, as well as those of the figures from Fars. The heads are all oval. The vertical element is, in each instance, accented by the nose which, although damaged at its apex on the Louvre figure, springs from the brow. The hair on the yellow limestone head and one other from Mohenjo-daro is tied in a bun and held in place by a band that encircles the head from the brow to near the base of the skull. In each of the other instances, the hair seems to fall behind the ears. The lateral lines of the brow, lips and eyes—which were inlaid—counterbalance the vertical elements of each of the heads.

Other details specifically relate the Mohenjo-daro 'Priest' to the Louvre statuette from Fars. The ears of each are doubly outlined, beneath each ear is a deep hole (visible in figures 20 B and C, and 19A). In writing about the 'Priest', Mackay (Marshall 1931: 357), suggested that the holes probably held a necklace. In view of how high the holes are, that seems unlikely. They may well have been intended to accomodate a headdress or wig, possibly one that covered the ears, such as the ceremonial headdress of the Sargonic period fround at Ur (Moortgat 1969, pl. 69). A headdress that covered the entire back of the head would also explain the extreme slant at the back of the head of the 'Priest'.

The head from Mundigak is significant because it was recovered from a Mundigak IV-3 level. It is thus possible to date it to the middle of the third millennium B.C. The head has frequently been mentioned in connection with the 'Priest' from Mohenjo-daro. Although the areas around the chin and mouth are too badly damaged to make a careful comparison possible, the rounded three dimensional form of the Mundigak head, the affinity to reality, the delineation of the ears, the slanted eyes, high forehead, straight line of the nose, and the hair band that ends in streamers at the back of the head point to its having been derived from the same artistic tradition as that of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the Mohenjo-daro 'Priest'.

In his analysis of the Early Dynastic period basement sculptures from the Nin-Hursag temple at Susa, Amiet (1976: 57, pl.XI/1-4), discussed the similarities among one of the heads in the group, the Dabar Kot head and the yellow limestone head from Mohenjo-daro. He noted that the sculptural correspondences, like those of the chlorite artefacts that have been found in Mesopotamia, Iran and India, contribute to the evidence of contact among pre-Sargon Elam, the eastern Iranian Plateau and India. A comparison of a damaged stone figure that was found in 1908 in the centre of the acropolis at Susa that Amiet (1966, fig. 144) dates *c.* 2700 B.C. with the Tepe Yahya IVB bust, (Lamberg-Karlovsky 1970, pl. 19c, fig. 22a) and one of just three seated stone figures from Mohenjo-daro (Marshall 1931, pl. C/1-3), further augments the evidence of early contact. Both the Susa and Mohenjo-daro figures appear to be kneeling. Their lower limbs are enveloped by the skirt of their garments. The upper portion of the Susa figure is nude, and that of the Mohenjo-daro image is partly covered by a garment which passes over one shoulder. The arms of the two seated figures are columnar, and barely-articulated, but their pectoral muscles and those of the Tepe Yahya bust are sharply delineated. A deep median line divides the torso of each of the three images, and long braids fall over the shoulders.

Iconographic Motifs

Probably the most well-known of the Indus Valley finds are the faience seals, and sealings. Among other things, they were the original basis for attributing the development of the Indus Civilization to Mesopotamia. Several of the seals had been found in the greater Tigris and Euphrates region in contexts datable to the Akkadian period, and several with similar or identical motifs to those of Mohenjo-daro have since been found in the Persian Gulf area (During-Caspers 1970-71: 107-118; 1979: 131-36; Porada 1971: 331-36).

The coated steatite seals found at Mohenjo-daro numbered more than three hundred. As at Harappa, and other Indus Civilization sites, most were square with perforated bosses on the back. A few were carved on both sides, and others were rectangular or cubed, with or without bosses. Very few were round. Two or three were shaped like cylinders (Marshall 1931: 370-77). The seals were apparently cut with a saw, the bosses rounded with a knife and finished with an abrasive, the holes in the bosses were bored. The designs and inscriptions appear to have been cut with a burin, and each seal seems to have been coated with a substance composed of 'steatite or talc' and fired (Marshall 1931: 378-79).

Various animals, real and fantastic, humped bulls, antelopes, elephants, tigers and complex geometric and whorl patterns, including the swastika, and of course the Indus Valley script appear on the seals. Human figures, others half human-half animal, with horned headdress frequently comprise the subject matter of many of the seals, and are portrayed seated or standing—often in combat with animals—or perched in the branches of a tree. Several seals portray figures on *yogic* posture and, on others, animals are depicted alone or in concert.

Among the most well-known of the seals is that of a horned deity seated in *yogic* posture on a throne, surrounded by an elephant, a tiger or lion (the striations behind the head of this animal suggest a mane), a buffalo and a rhinoceros. Two moufflons appear beneath the seat. The seal was found at Mohenjo-daro. Ever since Marshall (1931: 52-56) suggested that the deity may represent a proto-Siva image, the seal—although disputed—has come to be known as the 'proto-Siva seal' Doris Srinivasan (1975-76: 47-58), in a recent refutation of the Marshall interpretation, suggested that the significance of the seal is to be sought in the context of the Harappan culture's general preoccupation with the bull, an animal that commonly appears in the Indus finds in various forms: short-horned, humped and long-horned (Brahmani or zebu), and half-human. In fact, the bull appears to have been so significant during the third millennium B.C. that the zebu is depicted in the iconography of Mesopotamia and Susa, although —as noted above—it is foreign to the area. *207*

In the proto-Elamite context, the zebu is shown in profile. Painted on a vase dated to the first half of the third millennium, the animal's body is marked by chevron striations like those that appear on the body of the deity on the Mohenjo-daro seal (Amiet 1966, fig. 36). Srinivasan (1975-76: 48), compared the markings which contour the face of the deity on the Mohenjo-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

daro seal to the dewlap folds of skin that hang from the neck of a typical Indus bull figurine. A Susa cylinder seal presents an even closer parallel (Amiet 1966, fig. 53). The articulation of a bull's head in profile on the cylinder seal, dated *c.* 3000-2900 B.C., corresponds almost line for line to the folds and depressions that define the frontal view of the head of the deity on the Mohenjo-daro seal.

Srinivasan discussed the horned headdress of the figure on the Mohenjo-daro seal in detail. She compared it to that of two figures that appear on other Mohenjo-daro seals, and to the headdress of a figure on a terracotta plaque from Kalibangan. In those instances the central portion of the headdress between the horns is clearly meant to signify the branches of a tree (Srinivasan 1975-76: 55, figs. 2, 3, 4). Srinivasan suggests that the lines and fan-like projection between the horns of the deity in the present seal represent a stylized version of the horn and branch motif (Srinivasan 1975-76: 48). The projection, however, might also be compared to the fan-shaped protrusion that appears at the base of the horns just above the cranium of wild bulls portrayed in profile on a pink marble proto-Elamite cylinder seal of *c.* 2900 B.C. (Amiet 1966, fig. 59).

The hieratic composition of the Mohenjo-daro seal, which portrays a central figure surrounded by animals, suggests that the representation relates to the concept of lord of the beasts. The subject appears as early as the fourth millennium B.C. at Susa, and is represented by an anthropomorphized deity surrounded by animals. On a pear-shaped stone from the proto-urban period, a deity with the horns of a mouflon, dressed in a long skirt with what appears to be a chevron design, is portrayed subduing two lions. The stone is badly worn, but above the principal group, to left and right, appear what seems to be a scorpion and a fish (Amiet 1966, fig. 27A). The scorpion, fish, snake and *garial* appear in association with a horned figure in yogic posture, on a throne with the feet of a bull, on other seals from Mohenjo-daro (Srinivasan 1975-76: 55, figs. 12, 13). The same creatures are also included in other Susa representations of the lord of the beasts (Amiet 1966, fig. 36) datable to the last half of the fourth millennium B.C.

On the upper right segment of another well-known and complex seal from Mohenjo-daro, no. 430, a figure with a braid, and bull's horns that curve toward a vertical projection, stands within the branches of horseshoe-shaped tree. The figure is slender, wears bracelets on its left arm, and appears to be female. A similarly adorned devotee—with a long braid, horns that curve toward a tall projection, and bracelets on one arm — is seen kneeling and proferring an offering to the figure in a tree. Behind the devotee is a mountain goat with horns that undulate horizontally. Seen standing figures, each with a single horn or projection, and a braid that terminates in a round tasel, are arrayed below (Mackay 1938, pls. XCIV/430 and XCIX A). The only animal in the scene is herbivorous. It seems probable that the figure which appears to be feminine, and is framed by the branches of a tree, is a counterpart to the anthropomorphized bull-like figure surrounded by carnivorous or dangerous creatures.

Many human figures appear in other Indus seals. Many are engaged in domestic, hunting or agricultural activites. Only those in *yogic* posture —and not all such, although there are a few— and those that appear to be feminine and wear a braid, are portrayed with bangles. The bangles seem to be associated with deities and worshippers. It is in that context of deities and devotees that we might plausibly regard the otherwise unique image of the famous bronze 'dancing girl' *208* from Mohenjo-daro. Her lean arms are adorned with bangles, one completely, the other just above the elbow and wrist. Around her neck is a band with three pendant objects. She is otherwise nude. In her left hand is what seems to be a bowl or shell, possibly an offering.

The statuette is about 10 centimetres tall, and partakes of the same bold manner that characterizes other Mohenjo-daro figuers, particularly the bull-like 'lord of the beasts' and the figure that kneels before the tree deity in seal 30. The facial features—eyelids, nose and lips—are, however, unusually broad and heavy. The nude aspect, the emphasis upon the pudenda, the contrast created by the decorative elements—necklace and bracelets—set against the smooth skin, and the strikingly different facial features distinguish this figure from the third millennium B.C. imagery of the Iranian plateau and the Mesopotamian flood plain. The open quality of the pose, the agility and liveliness of gesture and stance, the columnar quality of the torso, the small high breasts, the manner in which the hair is worn and articulated,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

however, evoke the pantheon of deities and worshippers on seals from Tepe Yahya IVB and the Kerman region.

Deities and devotees, with and without horns, male and female, clothed or nude, appear standing, seated or kneeling, side by side in the medley of gods and worshippers represented in concert on Tepe Yahya IVB seals (Lamberg-Karlovsky 1973, fig. 26c). Only female figures, however, appear on seals from Shahdad (Hakemi 1976:
209 140), and on a complex seal found near Shahdad and now in the Foroughi collection (Amiet 1974, fig. 20). The hairstyle of the figures varies. In some instances it is worn pulled back and wavy, like that of the 'dancing girl' from Mohenjo-daro in others it is plaited like that of the figures on the Mohenjo-daro seal portraying a tree deity and devotee.

The extent and nature of the discoveries since 1970 at Shahdad, in Kerman on the edge of the Lut Desert, suggest that, from *c.* 2600-2200 B.C., Shahdad was a thriving centre in contact with Susa, Tepe Yahya, Shahr-i Sokhta, and the Indus Civilization (Asthana 1979). The finds highlight the importance of south-eastern Iran as a point of contact between west and east, Mesopotamia, Susa and Tepe Yahya on the one hand, and the lower Indus regions on the other, during E.D. II-III. A cylinder seal found at Kalibangan, reportedly in a period II 'mature Harappan' context (Thapar 1975, fig, 4). so completely conforms to the style of Tepe Yahya IVB and Shahdad seals, that it must be an import. Unfortunately, Thapar, who published the seal, did not indicate the specific location of the find or the material of which it is made. However, he dates Kalibangan II to the period from 2300-1750 B.C. (Thapar 1975: 32). Uncorrected ^{14}C dates from Kalibangan range within that time period. After MASCA corrections, however, seventeen of the twenty-four radiocarbon dates for period II appear consistent with the early to mid-third millennium dates for seals from Tepe Yahya IVB and Shahdad (Ralph *et al* 1979).

Stone Vessels

Although the trade in lapis lazuli was resumed during the E.D. II period, the development of Shahr-i Sokhta II and III as a major transfer point and the place where the lapis from Badakshan was worked, apparently curtailed any direct cultural impact from the west beyond the Helmand to the northern reaches of Afghanistan, Baluchistan, the Indus or southern Turkmenistan. Very little lapis lazuli was found at any of the Indus sites and the artifacts from northern Baluchistan, the Harappa region and Turkmenistan suggest that those regions continued to maintain a distinct material culture. Their pottery, figurines and stone vessels were, in the main, different from those of the cultural complexes of Mesopotamia and the Kerman region. Philip Kohl highlights this in dealing with the production and distribution of chlorite objects during the third millennium B.C.He posits the existence of distinct cultural regions on either side of the Lut desert based upon differences in the way in which stone and metal objects were worked. 'Soviet Central Asia, Seistan, south-western Afghanistan and northern Pakistan are', he found, 'linked by a common lithic tradition, best designated "Central Asian". (Kohl 1977: 116).

At Tepe Yahya, stone was worked with metal tools, at Shahr-i Sokhta, flint and stone were used. In the west, metal objects were cast, in the east, metal ingots were hammered. In other words, at Shahr-i Sokhta, metal was treated like stone. Sites west of the Lut, Kohl suggests, should be contrasted rather than compared with 'Shahr-i Sokhta whose relations and primary influence lay east not west of the great Iranian deserts'. Burins found at Tepe Hissar were rare at Shahr-i Sokhta. Shahr-i Sokhta arrow-heads and drills were absent at Yahya, but 'chlorite seals of a type found at Shahr-i Sokhta are also found at sites in Soviet Turkmenistan, along the middle course of the Helmand River, and in northern Pakistan (Kohl 1977: 124-25).

Tepe Yahya IVB was a major production and distribution centre for chlorite vessels. The site is in close proximity to four chlorite quarries. At Shahr-i Sokhta fewer chlorite objects were found, and it is still not known from where the site obtained its chlorite. Chlorite or steatite varies in colour. Figurines from Tarut are light grey. The Yahya stone is light to dark grey. Objects from Mohenjo-daro have been described as white steatite. At Shahr-i Sokhta, the chlorite is light green; but we do not know the source for varieties that are white or range from light to dark green. The corpus of chlorite found at Yahya, moreover, far exceeds that at Shahr-i Sokhta where lapis lazuli and other stones were more prominent. Carved steatite and chlorite vessels as

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

well as imitations of such objects in other stones and in pottery of the third millennium B.C.—many with shared motifs and common stylistic traits—were found througout the region from Mesopotamia to the Indus (Asthana 1976 and 1979). The place of manufacture as well as the source of the stone of particular objects is uncertain (Kohl 1977: 25).

Specific stylistic traits and iconographic motifs characterize the chlorite vessels found throughout Mesopotamia, Iran and Baluchistan. Kohl (1977) found only one example—a fragment with an imbricate design—among the Shahr-i Sokhta corpus of chlorite that could be classified as belonging to what has come to be known as the 'intercultural style'. Objects in that style were often inlaid with shell, stones or paste, and painted. Holes that formed part of the decorative schema of objects produced at Shahr-i Sokhta were drilled and then smoothed. 'At Yahya and other workshops specializing in the production of intercultural style vessels, the holes were cut and their interiors were then scratched so that the inlaid material would more firmly adhere (Kohl 1977: 118) as on the 'Priest' from Mohenjo-daro.

In the context of the Indus civilization,stone in general—apart from the steatite seals—and inlaid objects in particular were rare. Aside from the more than two hundred 'burnt'steatite intaglio seals and the two stone figures found at Harappa, three tiny and fragmentary steatite animal figures were found in strata that Vats dated to c. 3050-2850 B.C. a bird, an owl and a seated rhinoceros. That the bird and the owl were composite figures may be significant. In each instance, the feet were separately attached, as was the tail of the bird. In the case of the owl—the only owl found there—the eyes and ears had sockets for inlay (Vats 1940: 301-2). In addition, sixteen fragments of stone vessels were also found at Harappa, including two tiny burnt steatite vases. None were inlaid (Vats 1940: 310-11). The only stone objects that were decorated with inlay at Harappa were the unique owl and the two human figurines, the male torso and the 'dancer'.

Although carved stone vessels or fragments of vessels were found in Mohenjo-daro, Baluchistan and the Makran, they also number very few: 3 at Mohenjo-daro, 2 at Mehi in Baluchistan, and 2 in Makran, close to the Iranian-Pakistan border—in the Dasht Valley near Sutkagen-dor, and at Shahi Tump near Turbat (Durrani 1964). Two of the finds from Mohenjo-daro were parts of almost square compartmentalized vessels. The Shahi Tump fragment and the two from Mehi were from round compartmentalized vessels. Another fragment from Mohenjo-daro and the one from the Dasht Valley were each part of a curved bowl.

The curved fragment from Mohenjo-daro was decorated with an incised and raised reed-like pattern, and the one from the Dasht Valley with an imbricate design (Durrani 1964, pl. I/2 and 6), very similar to that of the only intercultural style fragment of chlorite found at Shahr-i Sokhta (Kohl 1977, figs. 1, 3). The same imbricate design appeared at Ur, Susa and Tepe Yahya (Miroschedji 1973, pl. II) Shahdad, (Hakemi 1972, pl. XIa,), and Tarut, (Burkholder 1971: 307, pl. III/2). The reed pattern on the Mohenjo-daro fragment is known from Mesopotamia, Susa (Miroschedji 1973 pl. IIj), and Shahdad (Hakemi 1972, pl. XV/C).

The interiors of the compartmentalized containers were each divided into four sections. The outsides of all but one from Mohenjo-daro were decorated with bands of incised chevrons or hatched triangles separated by thin horizontal bands (Durrani 1964: 66). Compartmentalized vessels were not found in Mesopotamia, the Persian Gulf region, Susa and Tepe Yahya, (Miroschedji 1973: 30-31), but similar square containers and round vessels of steatite with varied but incised designs were found at Shahdad (Hakemi 1977, pl. XIV A and B, XI C).

The bowl fragment with the imbricate design from the Dasht Valley was found in an unstratified context (Durrani 1964: 66); but the one with a reed pattern from Mohenjo-daro was discovered 28.1 feet (8.5 m) below datum (Mackay 1938: 7); and the fragments of compartmentalized containers from Mohenjo-daro were located in what are generally considered late levels (Marshall 1931: 369). The containers from Mehi and Shahi Tump were also found in unstratified layers, but because of the similarity to the compartmentalized vessel fragments from Mohenjo-daro, they, too, have been considered late (Durrani 1964: 39-41).

The relative dating of these carved or incised vessels, found in association with the Indus Civilization, accords with the typology outlined by Miroschedji. The imbricate pattern from the Dasht Valley and the reed pattern from Mohenjo-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

daro relate to designs on vessels from Mesopotamia, Susa and Tepe Yahya IVB that are categorized by Miroschedji (1973: 23) as belonging to an ancient series, datable to Early Dynastic II-III or E.D. III to the Akkadian period. The incised compartmentalized containers relate to a later group for which Miroschedji (1973: 39-41) tentatively proposed a date of *c.* 2400 B.C. Regardless of the absolute date that one accepts for any one of the carved stone fragments, the discovery of carved fragments of varied dates in the Indus Civilization context suggests intermittent rather than continuous contact beginning as early as the E.D. II-III period between the Indus, Iran, and Mesopotamia.

Summary

The evidence discussed by Oppenheim in 1954 and that presented by Lamberg-Karlovsky and Tosi in 1972 concerning trade mechanisms are consistent. Beginning sometime during the first half of the third millennium B.C., inter-regional trade by sea or land appears to have been transacted via intermediary emporia. By the end of the third and beginning of the second millennia, it seems, the names Makkan and Meluhha were no longer used in Babylonian texts to refer to the same distant reaches as earlier, but were limited to southern regions of those areas. As noted by Oppenheim (1954: 16), Landsberger suggested that the area referred to by the toponyms changed because the raw materials that had previously come from the 'eastern regions of these names' came in the later period from 'southern' Makkan and Meluhha.

Suggestions made here, based upon an analysis of the art of the Indus Civilization and its relation to the art of other areas, are consistent with Oppenheim's views and the regional trade patterns suggested by Lamberg-Karlovsky and Tosi. It appears that Harappa and the northern reaches of the civilization were the earliest to develop. By the middle of the third millennium B.C., and probably earlier, that region's external contacts were in the main restricted to the northern cultural areas, to the sphere that Kohl described as 'Central Asian'. However, the development and prosperity of the Mohenjo-daro region, and Lothal on the Gujarat coast, during the second half of the third millennium and into the second, were tied to the vissicitudes of trade with Iran, the Persian Gulf, and Mesopotamia.

The decrease in direct contact between Mesopotamia and the Indus at a time when such contacts with the Makran and Bahrein were maintained, and even increased, would account for the development and prosperity of the Indus settlements along the Makran coast, and the expansion of settlements in southern Baluchistan and the Sind as supply sources. It would also account for the limited incidence and early time period during which similarities appear to occur in the art of Mesopotamia, Iran, the Persian Gulf area, and the lower Indus regions (During-Caspers 1970-71; 1976, 1979, and Tosi 1974). Just as interruption of the trade in lapis lazuli during the E.D. I period seems to have terminated contact between southern Mesopotamia and the Harappa region, the curtailment of direct contact between the Tigris and Euphrates region and the lower Indus, and the development of Makran and Bahrein as exchange markets could account for the limited evidences of such contact during the second half of the third millennium B.C.

The evidence now available suggests that two distinct cultural complexes influenced the development of the Indus Civilization. In its formative state, the civilization was in direct or indirect contact primarily with one, and in its mature state, the other of those complexes. The earliest Harappan finds relate to the Namazga culture of Turkmenistan. Its characteristics are evident as early as the late fourth millennium B.C. along the land routes that ran through Seistan and Afghanistan on to northern Baluchistan, and through the Bolan, Mula and Gomal passes to Harappa. The second and, apparently, later complex, relates more closely to Mesopotamia and Iran and probably encompassed Tarut and Bahrein on the Persian Gulf. During the third millennium B.C. Mesopotamian—Indian contact may have depended upon direct or indirect trade that travelled either along the Makran coast or deviated from the coast via the Iranian plateau. Aside from the parallel and ties evident in the Shahdad finds, the coincidence of similarities in the pottery and stone vessels of Iran and the Makran during the last half of the third millennium B.C. is so extraordinary that as Fairservis (1975: 227) noted, 'the intimacy with which typically Iranian artifacts mingle with those of the Kulli type in Makran makes the problem of differentiation difficult.

The evidence from the Harappa region sug-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

gests a prolonged association with Turkmenistan and brief contact with proto-Elamite Susa. At Mohenjo-daro a predominately Iranian and Mesopotamian association is indicated. The Turkmenistan-Harappa association seems to have pre-dated the Mesopotamia-Indus connections.

The Bronze Age began in Turkmenistan during the late Namazge III period. Until then cultural influences seemed in the main to have travelled from southern Turkmenistan to the northern Indus regions. The Namazga stamp is recognizable is Seistan, south-western Afghanistan, northern Baluchistan, and the northern and central Indus regions. Beginning with the late Namazga III period, influences from Baluchistan and Harappa appear in Turkmenistan. Technologically, both south Turkmenistan and Harappa during the third millennium B.C. were at very much the same level, and comparable bronze implements have been found in each region. It is significant, in assessing the areas of contact at particular times, that in neither southern Turkmenistan nor the Indus region, do the dagger with a midrib or articles of glass appear, although they were known during the third millennium B.C. in Iran and Mesopotamia.

Alike in many ways, the Turkmenistan, Mesopotamian-Elamite and Indus cities of the third millennium B.C. appear to have been highly organized centres engaged in extensive long distance trade. Each of the societies maintained itself by surplus food stored in granaries (Masson 1964). In part, the growth of each was stimulated by trade and sustained by the agriculturally fertile river deltas of the surrounding areas. The people of Mesopotamia and Turkmenistan seem to have developed elaborate and extensive irrigation system (Lisitina 1969), and those of the Indus regions erected water storage and drainage system.

From Turkmenistan through Seistan and Baluchistan to India, and from Mesopotamia across the Makran to the Indus region, we find the development, during the third millennium B.C. of nucleated urban settlements surrounded by villages. In each, houses of several rooms were clustered around monumental structures. The distribution of furnaces and kilns, the existence of elaborate food storage facilities, extensive water control systems, (Masson and Sarianidi 1972: 97-103. Fairservis 975: 280), and the establishment of trading outposts suggest a highly specialized and entrepreneurial society in each culture. The comparable levels of technology that existed in the regions between Turkmenistan, Mesopotamia and the Indus and the interactions evidenced by stylistic influences that travelled among those regions further suggests that known techniques were, in each instance, adapted to local modes or needs.

It seems significant that no 'early' Indus site has been excavated (Fairservis 1975: 221 and 437) in spite of the more than three hundred 'Harappan' sites that are known to exist in India and Pakistan. The earliest settled areas of the subcontinent allied to the development of the Indus Civilization and Turkmenistan were, however, in northern Baluchistan, and M.R. Mughal has presented the case for the indigenous development of Harappan culture from the early settlements of Baluchistan (Mughal 1970).

To understand the evolution of the Indus Civilization differences and similarities between it and other cultures with which it was in contact must be weighed. Are the differences or the similarities more significant? If the difficulties and limitations of communication during the early millennia of settlement are borne in mind, the similarities and uniformity in the level of technological development, decorative schema, iconography and organization that existed across the thousands of miles from Turkmenistan and Mesopotamia to India, rather than the differences, are striking. The pattern of development of pre-Harappan society suggests that, as the areas of settled communities evolved, each adopted the known technology of the time of the resources of its region. Each society modified its artistic schema and religious beliefs in accord with local needs and modes—or depending upon its external contacts—in accord with influences that travelled along a network of distant contacts.

The Indus Civilization in its late phases extended to the east as far as Alamgirpur, near Delhi, to the west as far as Sutkagen-dor in the Makran; and south to the coastal areas of the Narmada and Tapti rivers. From *c.* 2000 B.C. to 1800 B.C. Lothal, the port city on the Bay of Cambay, developed and prospered. Most of the late settlements, however, were small and are identified by finds of seals with the Harappan script, by typical Harappan pottery—a black-on-red ware—and a characteristic sieve-line vase, as

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

well as bronze implements, and a host of copper and bone objects. Village economy continued to be based primarily upon cereal crops, cattle, sheep and goats. Of the civilization's many sites, only four or five can be categorized as town or cities. Our knowledge and surmises with regard to relationship among the village sites, or the village and town sites, as well as the extent of the civilization, are based upon finds of shared artefacts, and common vicissitudes that ranged far wider than the present national boundaries of the subcontinent.

The cumulative evidence suggests that Harappan-Namazga parallels may be dated to the end of the fourth and first half of the third millennia B.C. Mesopotamian, Iranian, and Mohenjo-daro parallels appear to date from as early as the beginning of the third millennium B.C. to the Sargonid and post-Akkadian periods. By the end of the Larsa period, *c.* 1760 B.C., 'international trade came to a virtual standstill' (Oppenheim 1954: 14-16; Dales 1968: 22). The vitality and identities of the Namazga, Akkadian and Indus Civilization dissipated by the end of the third, or early second millennia B.C. That the Indus Civilization waxed and waned at the same times as Turkmenistan, Susa,Mesopotamia and settlements on the Iranian plateau, forcefully suggests that its development, fortune and fate for more than 1200 years were linked to spheres that extended beyond its own boundaries.

In the interval betwen the passing of the Indus Civilization and the florescence of Vedic culture in the subcontinent, there is a qualitative and quantitative deterioration of the older modes, and a total disappearance of the Harappan script. The culture that emerges in India, and is generally attributed to the Aryan 'migration' which began after 1760 B.C., bears an uncertain relation to that of the Indus Civilization. The concepts, gods and goddesses of the Vedas do, however, partake of attributes that are visible in the Mohenjo-daro seals, and are similar to the textual and iconographic configurations found in contemporaneous Mesopotamia and Iran.

ACKNOWLEDGEMENTS

I am indebted to Prof. C.C. Lamberg-Karlovsky, and to Dr. Pierre de Miroschedji who read a draft of this paper. Their comments and suggestions were invaluable. I am also grateful to M. Rafique Mughal, who facilitated my work in Pakistan in every possible way, and provided the unpublished photograph of a plow from Bahawalpur. In Paris, Pierre Amiet, J.F. Enault, and J.C. Gardin were extremely informative and helpful. At the National Museum in New Delhi, S.P. Gupta extended courtesy and assistance. F.A. Durrani kindly provided me the photographs of Gumla figurines.

NOTES

1 We are not really sure what each area or structure was used for. Walter Fairservis relates an anecdote that seems relevant. Sir Mortimer Wheeler, when he became Director General of Archaeology in India after World War II, chose the raised area of Harappa for excavation, and concentrated his own efforts there. A colleague is said to have remarked that in planning to excavate, the French look for likely places to find temples, the Germans seek palaces, the British head for citadels, and the Americans inevitably find kitchens. The ethnocentrism becomes glaring when they all discover the same buildings.

2 Porada suggests that the lower legs of the lion may have been made of a different material from that of the body (1950: 223). The sockets on the Harappa figures suggest that their arms, as well as legs, might also have been of different materials.

3 This led Vats (1940: 321-22) to suggest that the standard itself may have been an object of worship prior to its association with the unicorn. A similar standard appeared in association with bulls on one of the silver vessels in the Fullol Hoard.

REFERENCES

Allchin, B. and Allchin, F.R. 1968. *The Birth of Indian Civilization*. Harmmondsworths. London.

Amiet, P. and Tosi, M. 1978. Phase 10 at Shahr-i Sokhta: Excavations in Square XDV and the Late 4th Millennium B.C. Assemblage of Sistan. *East and West*. Vol. 28, 1-2; 9-31.

Asthana, Shashi. 1976. *India's Contacts with other Countries from Earliest time to 300* B.C. B.R. Publishing Corp. Delhi.

———. 1979. Harappan Interests in Kirman. *Man and Environment*. Vol. 4; 55 ff.

Biscione, R. 1973. Dynamics of an early South Asian Urbanization: First period of Shahr-i Sokhta and its connections with southern Turkmenia. In *South*

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

gests a prolonged association with Turkmenistan and brief contact with proto-Elamite Susa. At Mohenjo-daro a predominately Iranian and Mesopotamian association is indicated. The Turkmenistan-Harappa association seems to have pre-dated the Mesopotamia-Indus connections.

The Bronze Age began in Turkmenistan during the late Namazge III period. Until then cultural influences seemed in the main to have travelled from southern Turkmenistan to the northern Indus regions. The Namazga stamp is recognizable is Seistan, south-western Afghanistan, northern Baluchistan, and the northern and central Indus regions. Beginning with the late Namazga III period, influences from Baluchistan and Harappa appear in Turkmenistan. Technologically, both south Turkmenistan and Harappa during the third millennium B.C. were at very much the same level, and comparable bronze implements have been found in each region. It is significant, in assessing the areas of contact at particular times, that in neither southern Turkmenistan nor the Indus region, do the dagger with a midrib or articles of glass appear, although they were known during the third millennium B.C. in Iran and Mesopotamia.

Alike in many ways, the Turkmenistan, Mesopotamian-Elamite and Indus cities of the third millennium B.C. appear to have been highly organized centres engaged in extensive long distance trade. Each of the societies maintained itself by surplus food stored in granaries (Masson 1964). In part, the growth of each was stimulated by trade and sustained by the agriculturally fertile river deltas of the surrounding areas. The people of Mesopotamia and Turkmenistan seem to have developed elaborate and extensive irrigation system (Lisitina 1969), and those of the Indus regions erected water storage and drainage system.

From Turkmenistan through Seistan and Baluchistan to India, and from Mesopotamia across the Makran to the Indus region, we find the development, during the third millennium B.C. of nucleated urban settlements surrounded by villages. In each,houses of several rooms were clustered around monumental structures. The distribution of furnaces and kilns, the existence of elaborate food storage facilities, extensive water control systems, (Masson and Sarianidi 1972: 97-103, Fairservis 975: 280), and the establishment of trading outposts suggest a highly specialized and entrepreneurial society in each culture. The comparable levels of technology that existed in the regions between Turkmenistan, Mesopotamia and the Indus and the interactions evidenced by stylistic influences that travelled among those regions further suggests that known techniques were, in each instance, adapted to local modes or needs.

It seems significant that no 'early' Indus site has been excavated (Fairservis 1975: 221 and 437) in spite of the more than three hundred 'Harappan' sites that are known to exist in India and Pakistan. The earliest settled areas of the subcontinent allied to the development of the Indus Civilization and Turkmenistan were, however, in northern Baluchistan, and M.R. Mughal has presented the case for the indigenous development of Harappan culture from the early settlements of Baluchistan (Mughal 1970).

To understand the evolution of the Indus Civilization differences and similarities between it and other cultures with which it was in contact must be weighed. Are the differences or the similarities more significant? If the difficulties and limitations of communication during the early millennia of settlement are borne in mind, the similarities and uniformity in the level of technological development, decorative schema, iconography and organization that existed across the thousands of miles from Turkmenistan and Mesopotamia to India, rather than the differences, are striking.The pattern of development of pre-Harappan society suggests that, as the areas of settled communities evolved, each adopted the known technology of the time of the resources of its region. Each society modified its artistic schema and religious beliefs in accord with local needs and modes—or depending upon its external contacts—in accord with influences that travelled along a network of distant contacts.

The Indus Civilization in its late phases extended to the east as far as Alamgirpur, near Delhi, to the west as far as Sutkagen-dor in the Makran; and south to the coastal areas of the Narmada and Tapti rivers. From *c.* 2000 B.C. to 1800 B.C. Lothal, the port city on the Bay of Cambay, developed and prospered. Most of the late settlements, however, were small and are identified by finds of seals with the Harappan script, by typical Harappan pottery—a black-on-red ware—and a characteristic sieve-line vase, as

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

well as bronze implements, and a host of copper and bone objects. Village economy continued to be based primarily upon cereal crops, cattle, sheep and goats. Of the civilization's many sites, only four or five can be categorized as town or cities. Our knowledge and surmises with regard to relationship among the village sites, or the village and town sites, as well as the extent of the civilization, are based upon finds of shared artefacts, and common vicissitudes that ranged far wider than the present national boundaries of the subcontinent.

The cumulative evidence suggests that Harappan-Namazga parallels may be dated to the end of the fourth and first half of the third millennia B.C. Mesopotamian, Iranian, and Mohenjo-daro parallels appear to date from as early as the beginning of the third millennium B.C. to the Sargonid and post-Akkadian periods. By the end of the Larsa period, *c.* 1760 B.C., 'international trade came to a virtual standstill' (Oppenheim 1954: 14-16; Dales 1968: 22). The vitality and identities of the Namazga, Akkadian and Indus Civilization dissipated by the end of the third, or early second millennia B.C. That the Indus Civilization waxed and waned at the same times as Turkmenistan, Susa,Mesopotamia and settlements on the Iranian plateau, forcefully suggests that its development, fortune and fate for more than 1200 years were linked to spheres that extended beyond its own boundaries.

In the interval betwen the passing of the Indus Civilization and the florescence of Vedic culture in the subcontinent, there is a qualitative and quantitative deterioration of the older modes, and a total disappearance of the Harappan script. The culture that emerges in India, and is generally attributed to the Aryan 'migration' which began after 1760 B.C., bears an uncertain relation to that of the Indus Civilization. The concepts, gods and goddesses of the Vedas do, however, partake of attributes that are visible in the Mohenjo-daro seals, and are similar to the textual and iconographic configurations found in contemporaneous Mesopotamia and Iran.

ACKNOWLEDGEMENTS

I am indebted to Prof. C.C. Lamberg-Karlovsky, and to Dr. Pierre de Miroschedji who read a draft of this paper. Their comments and suggestions were invaluable. I am also grateful to M. Rafique Mughal, who facilitated my work in Pakistan in every possible way, and provided the unpublished photograph of a plow from Bahawalpur. In Paris, Pierre Amiet, J.F. Enault, and J.C. Gardin were extremely informative and helpful. At the National Museum in New Delhi, S.P. Gupta extended courtesy and assistance. F.A. Durrani kindly provided me the photographs of Gumla figurines.

NOTES

1 We are not really sure what each area or structure was used for. Walter Fairservis relates an anecdote that seems relevant. Sir Mortimer Wheeler, when he became Director General of Archaeology in India after World War II, chose the raised area of Harappa for excavation, and concentrated his own efforts there. A colleague is said to have remarked that in planning to excavate, the French look for likely places to find temples, the Germans seek palaces, the British head for citadels, and the Americans inevitably find kitchens. The ethnocentrism becomes glaring when they all discover the same buildings.

2 Porada suggests that the lower legs of the lion may have been made of a different material from that of the body (1950: 223). The sockets on the Harappa figures suggest that their arms, as well as legs, might also have been of different materials.

3 This led Vats (1940: 321-22) to suggest that the standard itself may have been an object of worship prior to its association with the unicorn. A similar standard appeared in association with bulls on one of the silver vessels in the Fullol Hoard.

REFERENCES

Allchin, B. and Allchin, F.R. 1968. *The Birth of Indian Civilization*. Harmmondsworths. London.

Amiet, P. and Tosi, M. 1978. Phase 10 at Shahr-i Sokhta: Excavations in Square XDV and the Late 4th Millennium B.C. Assemblage of Sistan. *East and West*. Vol. 28, 1-2; 9-31.

Asthana, Shashi. 1976. *India's Contacts with other Countries from Earliest time to 300* B.C. B.R. Publishing Corp. Delhi.

———. 1979. Harappan Interests in Kirman. *Man and Environment*. Vol. 4; 55 ff.

Biscione, R. 1973. Dynamics of an early South Asian Urbanization: First period of Shahr-i Sokhta and its connections with southern Turkmenia. In *South*

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Asian Archaeology. N. Hammond ed. London; 105-118

Burkholder, Grace. 1971. Steatite Carvings from Saudi Arabia. *Artibus Asiae*. Vol. 33, 4; 306-22.

Casal, Jean-Marie 1961. *Fouilles de Mundigak*. Paris.

Dales, G.F. 1968. Of Dice and Men. *JAOS*. Vol. 88, 1.

———. 1973. Archaeological and Radiocarbon Chronologies for Protohistoric South Asia. In *South Asian Archaeology*, N. Hammond. ed. Noyes Press, London; 164-168.

Dani, A.H. 1970-71. Excavations in Gomal Valley. *Ancient Pakistan*. Vol. 5; 1-177.

Dupree, L. *et al* 1971. The Khosh Tapa Hoard from North Afghanistan. *Archaeology*. Vol. 24; 28-34,

Durrani, F.A. 1964. Stone Vases as evidence of Connections Between Mesopotamia and the Indus Valley. *Ancient Pakistan*. Vol. I; 51-96.

During-Caspers, E.C.L. 1965. Further Evidence for Cultural Relations between India, Baluchistan, Iran and Mesopotamia in Early Dynastic Times. *Jr. of Near Eastern Studies*. Vol. 24; 53-56.

Fairservis, W. Jr. 1975. *The Roots of Ancient India*. University of Chicago Press. Chicago.

Frankfort, H. 1977. *Art and Architecture of the Ancient Orient*. Penguin. London.

Francfort, H.P. and Pottier M.H. 1978. Sondage Preliminaire sur 1' establishment protohistorique harappan et post-harappan de Shortugai. *Arts Asiatique*. Vol. 34; 54-59.

Frumkin, G. 1970. *Archaeology in soviet Central Asia*. E.J. Brill. Leiden.

Gadd, C.J. 1932. Seals of Ancient Indian style found at Ur. *Proceedings of the British Academy*. Vol. 18; 3-22.

Ghirshman, R. 1963. Notes Iraniennes XII. Statuettes archaeques du Fars (Iran). *Artibus Asiae*. Vol. 26; 2; 151-160.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia and the Indian Borderlands*. II. B.R. Publishing Co. Delhi.

Hakemi, A. 1972. *Catalogue de l' exposition Lut Xabis (Shahdad)*. Tehran.

———. 1972. Decouverte d'une Civilization prehistorique a Sahdad an lord ouest du Lut' Kerman. *Memorial Volume of the Sixth International Congress for Iranian Art & Archaeology*. Tehran.

Halim, M.A. 1972. Excavation at Sarai Khola (part I). *Pakistan Archaeology*. No. 7; 23-89.

Hermann, G. 1968. Lapis Lazuli : The Early Phases of its Trade. *Iraq*. Vol. 30, 1; 21-29.

Hlopin, I.N. 1974. Ancient Farmers in Tedzen Delta. *East and West*. Vol. 24, 1-2; 51-87.

Jarrige, J.F. 1976. Nouvelles recherches archaeologiques en Baluchistan: les fouilles de Mehrgarh. *CNRS*. 567; 79-94.

Jarrige, J.F. and Meadow, R.H. 1980. The Antecedents of Civilization in the Indus Valley. *Scientific American*. No. 5; 243.

Lamberg-Karlovsky, C.C. 1970. Excavations at Tepe Yahya, Iran, 1967-69. *American School of Prehistoric Research*. Peabody Museum Bulletin. 27.

Lamberg-Karlovsky, C.C. and Tosi, M. 1973. Shahr-i Sokhta and Tepe Yahya : Tracks on the Earliest History of the Iranian Plateau. *East and West*. Vol. 23, 1-2; 65 ff.

Lisitsina, G.N. 1969. The Earliest Irrigation in Turkmenia. *Antiquity*. Vol. 43; 279-88.

Lyonnet, B. 1977. Decouverte de sites de l'age du bronze dans le N.E. de l' Afghanistan : leurs rapports avec la civilization de l'Indus. *Annali*. 37. N.S. 27; 22 ff.

Mackay, E.J.H. 1938. *Further Excavations at Mohenjo-daro*. Delhi.

Marshall, J. 1931. *Mohenjo-daro and the Indus Civilization*. London.

Masson, M.E. and Masson, V.M. 1959. Archaeological Cultures of Central Asia of the Aeneolithic and Bronze Age. *Jr. World History*. 5. 21 ff.

Masson, V.M. 1968. The Urban Revolution in southern Turkmenia. *Antiquity*. Vol. 42; 178-87.

Masson, V.M. and Sarianidi, V.I. 1972. *Central Asia: Turkmenia Before the Achaemenids*. Thames & Hudson. London.

Miroschedji, Pierre de. 1973. Vases et objects en steatite Susiens du Musee du Louvre. *CDAFI*. 3.

Moortgat, Anton. 1969. *Art of Mesopotamia*. Phaidon. London.

Mughal, M.R. 1970. *The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan*. Unpublished Ph.D. Thesis. University of Pennsylvania. Philadelphia.

———. 1972. A Summary of Excavation and Explorations in Pakistan. *Pakistan Archaeology*. No. 8.

Nagel, W. 1968. Fruhe Grossplastik und die Hochkulturskunst am Erythaischen Meer. *Berlin Jahrbuch fur Vor-und Fruhgeschichte*. 8; 99-136.

Oppenheim, A.L. 1954. The Seafaring Merchants of Ur. *JAOS*. Vol. 74; 6-17.

Porada, E. 1950. A Leonine Figure of the Protoliterate Period of Mesopotamia. *Jr. of the American Oriental Society*. Vol. 70; 225-26.

Porada, E. 1971. Excursus: Comments on Steatite Carvings. *Artibus Asiae*. Vol. 33, 4; 328-29.

Ralph, E.K. 1971. In *Dating Techniques for the Archaeologist*. Michael, H.N. & Ralph, E.K. ed. M.I.T. Press, Boston; 25-29.

Ralph, E.K. *et al* 1979. Radiocarbon Dates for the Indus Civilization and Related Sites. In *Ancient Cities of the Indus*. Possehl, G. ed. Vikas. Delhi; 358-59.

Rowland, B. 1954. *Art and Architecture of India*. Penguin. London.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Sankalia, H.D. 1978. *Prehistoric Art in India.* Vikas. Delhi.

Seidle, U. 1966. Zur Moortgat Festschriff . . . . *Berliner Jahrb. fur Vor-und Fruhgeschichte.* 6; 201-02.

Srinivasan, Doris. 1975-76. The so-called Protosiva Seal from Mohenjo-daro : An Iconological Assessment. *Archives of Asian Art.* Vol. 24; 47-58.

Thapar, B.K. 1975. Kalibangan : A Harappan Metropolis Beyond the Indus Valley. *Expedition.* Vol. 17, 2; 19-32.

Tosi, M. and Wardak, R. 1972. The Fullol Hoard : A New Find from Bronze Age Afghanistan. *East and West.* Vol. 22, 1-2; 9-17.

Vats, M.S. 1940. *Excavations at Harappa.* Govt. of India. Delhi.

Wheeler, R.E.M. 1947. Harappa 1946 : The Defences and Cemetery R 37. *Ancient India.* No. 3; 58-130.

———. 1968. *The Indus Civilization.* (3rd ed.) Cambridge.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

43

S.P. Gupta

Internal Trade of the Harappans

Trade has two major areas of operation: (*a*) within a restricted geographical and/or cultural zone; and (*b*) over varied geographical and/or cultural zones located outside the former. The former we call internal and the latter external.

Here our main concern will be internal trade since we feel that, without a strong internal trade network, the external trade of the Harappans was not possible. And also because the marked uniformity in the Harappan material culture was the by product of a large network of internal trade, both regional and inter-regional; it was not at all an imposed phenomenon in which the rulers were directly involved.

As the first step in our methodology to understand the salient features of internal trade, we will try to locate the main manufacturing centres of some important goods produced by the Harappans. Our next step will be directed towards locating short-distance trade-routes. We shall not enter other aspects of this trade. But we will take the help of certain case-studies.

Questions Relating To Internal Trade

To this purpose, we have addressed certain questions to our available source-material to elicit some useful information.

1. In What Materials Did The Harappans Trade Amongst Themselves? Let us elaborate this question. We would like to know what items say the town of Harappa manufactured and exported to Kalibangan, Banawali, Ropar, and other sites in the Punjab and nearby regions as well as to Lothal in Gujarat. This question may be extended to cover all Harappan sites — such as, what items manufactured at Lothal were brought to Surkotada in Kutch and, Mohenjo-daro and Kot Diji in Sind, and Harappa in the Punjab. And, of course, *vice-versa*.

2. How Did The Harappans Trade Amongst Themselves? Let us elaborate this question also. We would like to know how a trader from Harappa carrying his manufactured goods reached, say, Kalibangan? Also, one would like to know how and from where the Chanhu-daro artisans got chert for blades; cornelian, agate and steatite for beads and seals; and how and from where the Lothal artisans also got the same items because, in both examples, the materials quoted were not locally available. In other words, we will like to discover the sources of raw-materials and trade-routes of the Harappans within the boundaries of the Harappan culture-zone.

In this context, we will also like to put certain related questions, such as which are the points on which the traders may have crossed the mid-way rivers to reach different towns? Where are the ferry points on the Indus for the Mohenjo-daro people? And above all, what system of trade — direct dealing or agency system, central-place exchange or direct exchange (carrying goods directly from the place of 'manufacture' to the place of 'consumption') — was followed?

There may be many other questions relating to the internal trade of the Harappans which, we are sure, will be raised in future.

Having raised so many questions, we will now give some thought to them.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

All the four hundred odd known sites of the mature Harappans, it occurred to us, will not be 'industrial towns' as such. That is to say, although many of them may have been manufacturing some items for exchgange, it is hardly possible that each one was producing them in quantities which could be 'commercial propositions'. If so, which were the real industrial towns?

Industrial Towns of the Harappans

On the basis of published reports, we have been able to gather some material which gives the impression that Lothal, Chanhu-daro and Harappa were some of the major industrial towns of the Harappans. Mohenjo-daro may not fall in this category, although it has been the richest town of the Harappans in every sense of the term and it is not possible to remove it completely from the list of commercial towns. The reasons for this will become obvious in the course of our discussion. Let us consider why Lothal, Chanhu-daro and Harappa are considered major industrial towns of the Harappans.

Proceeding from the known to the unknown, we posed a question to ourselves — which were the industrial towns of India and what were their main products prior to the introduction of European industries? The answer — Varanasi produced brocade; Mysore and Kanjeevaram: silk; Dacca: muslin; Mirzapur: brass-ware and carpets; Moradabad: nickle ware;and Delhi, the capital city, nothing special, it was in fact, an emporium for all the above(Birdwood 1880). It means, while the rich capital city did not specialize in anything particular, many good things came to this city from all over the country. It is, of course, besides the point that a few outstanding artists and craftsmen who received royal patronage settled in Delhi, opened small-scale industries and fed the elite; in fact, Mohenjo-daro had also industrial areas with lots of waste material — flakes of semi-precious stones, lithic micro-drills, copper slags, pieces of crucibles, burnt patches, etc. (personal observation during a two day visit to the site in 1963) — but we feel that these areas produced only valuable objects more or less, exclusively for the selected few. In other words, the traditional industrial pattern of India was based on the system of specialized trades. This was also true of Europe till the 18th century.

We are not absolutely sure if this pattern can be imposed on the Harappans. But let us hypothesize that something of this kind can be visualized for them too and then see how far it works.

LOTHAL

Beginning with Lothal, we agree with Rao (1973: 102-3) that it specialized in lapidary. We need hardly repeat here his discovery of a bead making factory and all its attendant paraphernalia. He has rightly pointed out that semi-precious stones for these beads most probably came from the Rajapipala mines. Possibly, the same holds good for Chanhu-daro (Mackay 1943) where also we have exactly the same kind of evidence — a bead-making factory, lumps of different stones, a large number of stone and metallic drills, chisels, etc. Etched cornelian beads were almost exclusively manufactured at Lothal and Chanhu-daro both for home-consumption and for foreign-markets.

We, therefore, propose that although stone-beads of the kinds manufactured at Lothal and Chanhu-daro may have been made at other places also, including Mohenjo-daro, yet Lothal and Chanhu-daro alone provided quality products in quantities which were a commercial propqsition.

And if it was really so, one can easily visualize how the uniformity in the bead-typology of the Harappans was achieved. These two towns were the trend-setters for other factories too, wherever else they may have been.

CHANHU-DARO

Let us take the case of Chanhu-daro once again but in a different context — as a seat of steatite-seal making industry. The available evidence clearly shows that it was the major centre of production for the beautiful seals we have gathered from a dozen or more Harappan sites. We have from this site the largest number of unfinished seals; on some of them the inscription is complete but the pictorial area is completely blank; on some others, the picture is there but the inscription is apparently incomplete; on still some, the knob on the reverse still remains to be carved out. In some examples the pictures remain unfinished. Coupled with this, we have a large number of metallic implements, including engravers, which are likely to have been used for cutting steatite to required sizes, engraving inscriptions and scooping figures in intaglio (Mackay 1943).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

There are also the remains of a very elaborate furnace with flues running below the floor in a criss-cross manner (Mackay 1943). Although the excavator has not been able to determine the mode of their use; as a matter of fact in the absence of ash, etc., he went to the extent of doubting if the furnace was actually used. Yet there does not seem any valid reason for such suspicion when we know that the flues possibly carried steam as an energy source — as flues, in the case of *hammams* or hot-water baths, actually did in mediaeval times. Of course, flues in the two contexts are constructed differently, nevertheless, functionally, they are the same. We clearly visualize the use of this furnace in heating steatite seals, beads, etc., a step required for strengthening the stone, for glazing the surface, for changing the colour of raw materials, etc. It was probably the most sophisticated furnace of the Harappans.

We, therefore, see a situation in which orders for standard seals were placed by established Harappan merchants and other users usually with the Chanhudarian seal-cutters. This may again explain the marked uniformity in the classical steatite-seals whether manufactured and found at Lothal or Mohenjo-daro or Harappa or Kalibangan or Banawali. It may be mentioned that here we have not included a large number of steatite, paste and faience seals and sealings, in different shapes and sizes, from Harappa, where, from the lower levels, they have been found in tiny sizes, since undoubtedly they were the local products of inferior quality for some specialized purpose such as accounting, as Kinier Wilson visualizes. (See elsewhere in this volume-ed.).

Fig.43.1. From Harappa to Kalibangan, probable trade-routes

HARAPPA

Let us now turn to Harappa. We have here a row of 'workmen-quarters' and at least seven well-laid furnaces of different shapes and sizes Some appear to have been associated with steatite and faience industries and some with metallurgy (Vats 1940). Metallurgy has also been suspected in the context of one furnace in the DK area at Mohenjo-daro. Chanhu-daro has also yielded similar evidence. Lothal (Rao 1980), according to the excavator, has yielded the remains of two kinds of copper-smithy kilns one is circular in plan which was used for smelting copper-ingots, and the other is rectangular in plan which was used for casting tools and ornaments. Near a circular kiln, an irregular sheet of molten metal, obviously dropped accidentally and never picked up for re-smelting and re-use, was found along with a thick terracotta, bowl-like crucible. It is, therefore, clear that Harappa had to share the status of being a major metallurgical centre with Mohenjo-daro and Lothal.

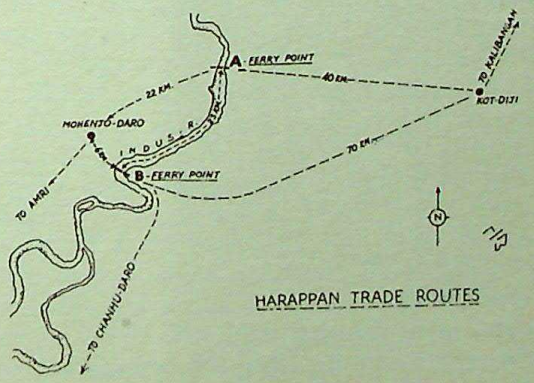


Fig.43.2. From Mohenjo-daro to Kot Diji, Probable trade-routes

Obviously, other towns of this kind, such as Kalibangan, also existed. At Kotala Nihang near Ropar (or Rupanagar) too, shallow circular metallurgical-kilns have been located. Evidence of this kind would suggest that metallurgy was a much more diffused industry than that of stone beads and seals. And this is understandable since urbanism of the Harappan kind requires a strong metallurgical base for activities connected with stone work, shell work, wood work, etc. Still, it is possible that sites like Mohenjo-daro, Harappa and Lothal were important centres of metallurgy, producing tools and weapons as well as kitchen ware and objects of art for wide distribution, possibly with strong regional bias.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Raw Materials

Semi-Precious Stones: Trade in the raw material used by the Harappans has always attracted the attention of scholars and need not be repeated, except that we agree with Rao that the town of Bhagatrav possibly procured semi-precious stones from Rajapipala for her own requirements and for Chanhu-daro also. Similarly Chanhu-daro may have procured blade-making chert from Sukkur-Rohri for the Gujarat towns. As yet, we do not know who monopolized the procurement of copper, particularly the mines in the Khetri belt. However R.C. Agrawala (1979) seems correct in observing that the Ochre Coloured Ware people of Ganeshwar and Jodhapura living in this area may have done it. Copper tools have been found at these sites in hundreds and corrected radiocarbon dates take the antiquity of the sites back to the mid-late third millennium B.C.

We also attach great importance to the raw material the Harappans may have found around Shortugai, a recently discovered Harappan site on the Oxus, for Chanhu-daro or Mohenjo-daro or Harappa (Gupta 1979). Semi-precious stones like turquoise, which comes from the Kizil Kum area of Soviet Central Asia, lapis lazuli, which comes from Badakshan, silver which comes from north-eastern Afghanistan, gold which comes from Siberia to the Oxus are found used in ornaments and luxury items (Wheeler 1953:59) at the Harappan towns of Mohenjo-daro, Harappa and Chanhu-daro. The evidence from Jalilpur (Mughal 1974:108) clearly shows that lapis, for bead-making, was brought here in large quantities even during the pre-Harappan period. The evidence from Banawali (Bisht and Asthana 1979), is that, even during Harappan times, at least some sites used this highly precious mineral in appreciable quantities. Tin, sometimes reported in small quantities in the Khorasan region of north-eastern Iran and in Soviet Central Asia, may also have been procured by them for making bronze, but in this respect definitive work remains to be done.

Pottery: A word regarding pottery. Present studies have not been able to tackle this subject sufficiently in depth. We, however, did try to see if the typical stud-handled bowls from Lothal and other sites in Gujarat are found in Sind and the Punjab. Of course, none have so far been located. But Gujarat sites as well as the Oxus site of Shortugai do have typical shapes of Sind and Punjab, e.g. the 'S' shaped jars and large dishes-on-stand. And since they are not found in numbers equal to Sind and Punjab sites we suspect that some of them, such as the 'S' shaped painted jar from Lothal, a frequent text-book example, came from Sind Harappan sites. These facts show that trade in pottery was largely regional in character; only in rare examples it was inter-regional.

Chert: Closely associated with metal objects, seals, pottery, etc., are chert blades. Undoubtedly, the Rohri hills had been the major source for the kind of chert used for blades found at most Harappan sites. Recent studies by Bridget Allchin (1979) clearly show that both, nodules and blades, were exported from this source (where several factory-sites have been located) to Kot Diji, Mohenjo-daro, Chanhu-daro, Allahdino, etc., towards the south-west of these hills, and to Kalibangan, Harappa and other sites north-east of the hills. To places like Mohenjo-daro, the material could be sent from Bukkar, the major site of Harappan blade industry in this region, by boats downstream the Indus. To sites like Kalibangan and Harappa, it could again be sent by boats plying the Nara-Hakra-Ghaggar. To other sites, like Kot Diji, located on the outskirts of the Rohri hills, and Chanhu-daro, these tools cold even be sent by road. There is, therefore, ample evidence to show that there was a net-work of land and water routes connecting this source-material area with major Harappan towns.

Shell: This study can be extended to other industries as well, for example, shell and ivory. Interestingly, Balakot (Dales 1979) on the Arabian coast has now turned out to be a great centre of shell industry although the shell used for making bangles at this site is largely bivalve *Meretrix Casta*. Studies in the distribution of *Meretrix Casta* bangles at different Harappan sites will, therefore, throw significant light on the internal trade pattern of the Harappans.

Durante (1979) has made a detailed study of marine shell working and trade in South Asia and Iran. The shells of the species known as *Xancus pyrum L*, found largely on the coast of Kathiawar, Gujarat, have been found at the Harappan sites of Lothal, Rangpur, Balakot, Mohenjo-daro, Harappa, Gumla and Shahr-i Sokhta in pre-Harappan levels. Bracelets, beads, inlay pieces,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

vessels, seals, etc., were made from it. It is significant to note that, at all these sites, shell was imported as a raw material and worked locally into different shapes. In other words, 'the finished product was not manufactured in the gathering area but in that of the market. This indicates that the manufacture was the result of a direct sporadic demand' (Durante 1979). The importance of this item is comparable with that of the Rohri-Sukkur chert, as well as lapis lazuli whose distribution is also very limited in Harappan times.

Trade Routes

We now come to trade routes. It is significant to note that:

> In 1851 Bartle Frere found in all Sind not a mile of bridged or metalled road, not a masonry bridge of any kind, in fact, not five miles of any cleared road. Roads in truth are not a Sindhi institution. The sandy plain lies before the camel, to go whither he listeth. When the inundation came and the camel could not go, it created over all the land waterways for boats or floats of reeds and grass. *But there are well recognized routes*, by which the traffic between the large towns was carried on in the dry season, *avoiding insuperable obstacles.* Such were the routes from Karachi to Shikarpur, from Karachi to Kotri and, by ferry, Hyderabad, from Hyderabad to Tatta and Lakhpat, to Jodhpur, to Multan. Road making began in earnest with Sir Bartle Frere .... The boat ferries over the Indus and canals number in all more than a hundred, besides some of a temporary character (Aitken 1907::341-2).

This paper, therefore, cannot possibly deal with trade routes exhaustively. It has taken the trade-routes connecting Harappa with Kalibangan **(fig. 43.1.)**, and Mohenjo-daro with Kot Diji **(fig. 43.2.)** as case-studies in the light of the above observations as well as the geography of the land and archaeological discoveries made during the last five decades.

Case Studies

In the absence of any deciphered record of the Harappans, we have to fall back upon the present in order to understand, however vaguely, the past. In doing so we posed a question to ourselves: if we were residents of Harappa and were asked to go to Kalibangan with a consignment of copper objects how could we make the journey which was both easy to undertake and profitable in commercial terms? We would, of course, hire a boat and reach the confluence point of the Ravi and the present-day Sutlej. Then we would have got down there; walked a little while; taken another boat going up-stream the Ghaggar and finally, reached Kalibangan. The whole journey may have taken a week. But this must had been extremely cumbersome and we would have asked our friends, at Harappa, 'can we not go on a bullock-cart along a shorter and more direct route, spending only three to four days? We don't mind crossing the intervening rivers in boats or over improvised wooden bridges, provided there are no unsurmountable barriers, such as the inhospitable deserts or mountains'.

A Probable Answer: 'During the lean months, yes you can undertake this kind of journey very easily. Just follow the foot-paths across the fields and move towards the south-east as the crow flies and you will be at Kalibangan'.

From Harappa to Chak Purbane Sayal, some 30 km in the south-east (here a Harappan mound still exists), one can easily go on foot or in a bullock cart. From there to Kalibangan two major routes still exist, and the Harappans may have used either or both of them **(fig. 43.1.)**.

This somewhat graphic, and admittedly largely imaginative, description may one day be discarded in favour of some more definite route or routes, but looking at the geographical map of this region and the land-routes followed for the last two centuries, one would agree that the land-route joining the two cities could not be much different from the ones used this day. The need is to see if, besides Chak Purbane Sayal, other Harappan sites also dot the routes connecting the two settlements.

Let us take the other case-study, that of the route joining Mohenjo-daro with Kot Diji **(fig. 43.2.)**. The two sites are on the opposite banks of the river Indus, the former is practically on the bank while the latter is about 40 km away. There are two modern Ferry Points (abbreviated hereafter as FP) on the Indus, marked FP-A and B in **(fig. 43.2.)** From the Stupa Mound to A it is 22 km. The total distance thus comes to 62 km. From the Stupa Mound to FP-B it is only 6 km. But from Ferry Point B to Kot Diji, the caravan route, passing through dry sandy land, is about 70 km. In other words, the southern route through FP-B was slightly longer, by about 4 km, than the northern route passing through FP-A. But the southern route had one very obvious advantage — the 6 km distance on the right bank was largely covered by an extension of the city

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and, therefore, the unloading facilities at FP-B was easier and quicker than what they were at A. From Kot Diji the route to Kalibangan was smooth. For Amri and Chanhu-daro there were two separate routes (**fig. 43.2.**).

This line of research, coupled with detailed topographical maps, may yield the desired results in other regions as well.

Trade Mechanism

This brings us to another very vital question for which we have no direct archaeological evidence but about which some useful guesses can be made — the operative system of trade between one Harappan city and the other. The question of Indus trade mechanism was first raised seriously by Max Mallowan (1965) but he confined himself to West Asia with Indus as a marginal area of interaction. In other words, his concern was the mechanism of long distance trade. Following him, three bold attempts were made in the same direction — first by During Caspers (1972), second by Lamberg-Karlovsky (1972), and the third by Shashi Asthana (1979). The first visualized direct trade through Harappan colonies in Mesopotamia, the second visualized central place exchange through entrepots like Tepe Yahya, and the third argued in favour of an agency system in which the role of local authorised agents and foreign resident agents played a decisive role. But none of these scholars worked on the mechanisms of internal trade.

In this trade the problems are entirely different because the distances are comparatively short, culture-area is homogenous and, perhaps, the state either worked under one government or under friendly governments using one and the same script and language. The model one can try building for this trade can take useful clues from Asthana's reconstruction rather than those of others because, in the operative system she visualizes, some thought has been given to the 'Production Unit' which exclusively concerns internal trade. She divides the production unit in two major parts (*a*) the sub-unit looking after the availability of raw materials; and (*b*) the sub-unit looking after the manufacture of goods (Asthana 1979: 34). We shall not repeat this aspect of her analysis since many of us broadly agree with her. But what she left untouched will be our concern here — once raw material was procured and goods manufactured, how were they distributed within the Indus culture-area, particularly, inter-region wise?

We will begin with the basics: all trade depends on Demand and Supply; today in our consumer society demand is not just natural, it is often artificially created, but it is doubtful if this modern phenomenon can be completely imposed on the past. We, therefore, understand Demand in terms of basic needs and also those which arose in the wake of Harappan urbanism. In order to understand the demands of the former kind we have to locate item-areas of deficiency and item-areas of plenty. Modern market surveys provide some useful clues in this direction.

Items of Inter-regional trade

Let us begin with two food items, wheat-barley and rice. While the wheat-barley group of cereals are plenty in the entire Harappan culture-area, rice seems imported in the Punjab from Gujarat (at Lothal, the cultivation of rice has been amply attested to, Rao 1980). In this context, indirect evidence comes from Vedic literature, basically of Punjab-Haryana origin, in which sacredness is attached to locally produced barley which was used in all kinds of religious sacrifices but not to rice which was sparingly used, as has been attested to at Banawali (Bisht and Asthana 1979). Thus the proposition — Lothal exported rice to Banawali and other towns in the Punjab and Haryana.

Cotton is grown both in Gujarat and Punjab-Haryana but undoubtedly much more in the former area; the reason being simple — the so-called Black Cotton Soil predominates in Gujarat. We, therefore, propose that Lothal and Surkotada filled a large gap in the growing demands for cotton in the expanding townships of Mohenjo-daro, Harappa, Banawali, etc. because supply of local agricultural produce was limited (Sethana 1982).

Wool is yet another commodity the demand of which must have been heavy in the cold winter months of the Punjab. Sheep, the main source of wool, has, however, never been herded here in numbers as may fulfil local needs. Gujarat towns probably filled the gap for wool as well. However, the Baluchi towns of Nowsharo, Dabar Kot, etc., may have been equally important, if not more, for sheep and goat have always been domesticated in Baluchistan on a large scale and in a

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

greater variety.

More than a thousand copper artefacts have been found by Fairservis (Shaffer 1974; 1977: 22-26; 1979) at the very small settlement of Allahdino, near central Karachi (also called Nel's Bazar); obviously most of it was meant for some large Harappan town. We suspect that they were collected here for transhipment to Surkotada, Desalpur, etc. in Gujarat where it is doubtful if copper-bronze tools were locally produced in sufficiently large numbers; except for Lothal, of course.

Ivory, lapis, turquoise and silver objects, found in extremely limited quantities in Gujarat sites, obviously came from Punjab and sites of Harappa and Mohenjo-daro which became centres of urban luxury.

Sea-shells of different varieties, on the other hand, were exported from Balakot and Lothal to sites in Baluchistan as well as the Indus, as also noted earlier (Durante 1979).

There may be more items on which detailed work can be done but it is hoped that the basic trends of inter-regional internal trade have emerged here.

Guild System

This then leads us to the final question we posed earlier — if the long-distance trade-mechanism is not applicable to internal trade mechanism what else has been the pattern? We visualize a Guild System in which trade was direct, between one city and the other, but the control over large transactions was neither in the hands of individuals nor the government. We know enough of this system prevailing in India in historical periods (Majumdar 1922). But it is hard to prove it so long as the Indus script remains undeciphered. However, we have a line of approach and it is based on the evidence of seals. Guilds normally had their own monograms or symbols. There are a dozen important monograms, with the unicorn as the most popular one, occurring 1159 or more times (Mahadevan 1977: 8). Bull comes next, followed by elephants, tigers and a few mythical ones. We are not concerned here with their status, religious or otherwise. What we want to emphasize is that each symbol probably belonged to a guild, and the most powerful guild was that whose symbol was a unicorn. Possibly, their base was Mohenjo-daro, which has yielded the largest number of seals and sealings, 1540, with Harappa as a powerful centre towards the east (it has yielded 985 seals and sealings) and Lothal in the south-west, which has yielded 165 of them (Mahadevan 1977: 6). The membership of the guilds has always been hereditary since, in all ancient societies, technology passed smoothly from one generation to another in a linear fashion. Whether these guilds also enjoyed political power is not what concerns us here. What we want to emphasize is simple: internal trade of the Harappans was perhaps controlled by guilds since they can easily organize a chain-exchange through both short and long distance transportation of goods with professional faith at all levels of distribution.

THE ROLE OF NOMADS

The guild system provided organized trade in major items, but in the field of internal trade a big role is always played by non-organized trade (Shaffer 1977). It is conducted at two levels: one, at the level of nomads; and the other, at the level of urban individuals. The former has regularity but not the latter. The regularity of the former depends upon various factors, such as seasonal migrations from the areas of climatic hardships to areas of permanent settlement in a milder climate (till recently, people from Baluchistan migrated to the Indo-Gangetic plains during the winter months), or else, migrations in search of suitable pasture for animals in the summer months when draught conditions prevail in various areas of western Rajasthan and eastern Gujarat. The nomads, by experience, know what items they can easily procure, carry and sell in the markets of their temporary abode. Usually, there are small items of natural produce, such as semi-precious stones, spices and dry fruits; or manufactured goods such as metallic implements and handicrafts. On the other hand, internal trade based on individual transactions, is barely identifiable. Individuals carrying jungle produce, such as fire-wood, honey, game, fruit and medicinal plants to nearby markets in villages and cities also play a significant role in internal trade, though at a lower level and in a limited quantity. Dates, *shilajeet*, (a medicinal product of the Himalayas) etc. found at Mohenjo-daro represent those items which may have come from nomadic trade of one kind or the other.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Conclusions

The present paper is, however, only exploratory in nature, in search of methodology rather than solutions in an untrodden field of Indus studies. It only emphasizes the fact that the problem of internal trade was multifcacted, it operated both on the regional level and the inter-regional level, and the guild system coupled with nomadic trade behaviour may be a valid model in which we can understand the internal trade of the Harappans.

References

Aitken, E.H. 1907. *Gazetteer of the Province of Sind* Karachi.

Agrawal, D.P. 1971. *The Copper-Bronze Age in India* New Delhi.

Agrawal, R.C. 1981.Recent Explorations in Rajasthan. *Man & Environment*. Vol. V; 59-63.

Allchin, B. 1979.Stone Blade Industries of Early Settlements in Sind. In *South Asian Archaeology 1977*, M. Taddei ed. Naples; 173-212.

Asthana, Shashi 1979. Indus-Mesopotamian Trade: Nature of Trade and Structural Analysis of Operative System. In *Essays in Indian Protohistory*. D.P. Agrawal and Dilip K. Chakrabarti ed. New Delhi.

Birdwood, G.C. 1880. *Industrial Art of India*. London.

Bisht, R.S. and Asthana, S. 1979. Banawali and Some other Recently Excavated Harappan Sites in India. In *South Asian Archaeology, 1977*. M. Taddei ed. Naples; 224-40.

Dales, G.F. 1979. The Balakot Project: Summary of Four years of Excavations in Pakistan. In *South Asian Archaeology*, 1977. M. Taddei ed. Naples; 241-74.

Durante, S. 1979. Marine Shells from Balakot: Shahr-i Sokhta and Tepe Yahya: Their Significance for Trade and Technology in ancient Indo-Iran. In*South Asian Archaeology, 1977*. M. Taddei ed. Naples; 317-44.

During Caspers, E. 1972. Harappan Trade in the Arabian Gulf in the third millennium B.C. *Mesopotamia*, Vol. 7; 167-91.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia, and the Indian Borderlands*. Vol. II, New Delhi.

Kohl, Philip 1979. The Archaeology of Trade. *Dialectical Anthropology*. Vol. I; 34-50.

Lamberg-Karlovsky, C.C. 1972. Trade Mechanism in Indus-Mesopotamian Inter-relations. *Jr. American Oriental Society*. Vol. 92; 222-29.

Mackay, E.J.H. 1943. *Chanhu-daro Excavations 1935-36*. New York.

Mahadevan, I. 1977. *The Indus Script: A Concordance*. New Delhi.

Majumdar. R.C. 1922. *Corporate Life in Ancient India*. Poona (2nd Ed.).

Mallowan, Max 1965. The Mechanism of Ancient Trade in Western Asia. *Iraq*. Vol. 3; 1-7.

Marshall, J. 1931. *Mohenjo-daro and the Indus Civilization*. London.

Mughal, M.R. 1974. New Evidence of the Early Harappan Culture from Jalilpur, Pakistan. *Archaeology*, Vol. 27, 2; 106-113

Rao, S.R. 1980. *Lothal*. Memoire, Archaeological Survey of India. No. 78, Vol. I. New Delhi.

Shaffer, J.G. 1974. *Allahdino and the Mature Harappan: A Preliminary report on the cultural startigraphy*. Department of Anthropology, Case Western Reserve University, Cleveland (Mimeographed).

———. 1977. *Prehistoric Baluchistan*. New Delhi.

———. 1979. The Indus Civilization: New Evidence from Pakistan. In *Essays in Indian Protohistory*, D.P. Agrawal and Dilip K. Chakrabarti ed. New Delhi. 17-29.

Sethana, K.D. 1982. *Karpasa cotton in Prehistoric India*, Biblia Impex, New Delhi.

Vats, M.S. 1940. *Excavations at Harappa*. New Delhi.

Wheeler, R.E.M. 1953. *The Indus Civilization*. New Delhi.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

44

K.A.R. Kennedy

Trauma and Disease in the Ancient Harappans

Over the course of the past fifty years of archaeological investigations of Harappan settlements, a thesis has persisted which concerns a massacre of a number of individuals some four millennia ago at Mohenjo-daro, the large urban centre on the Indus. It is ironic that this preoccupation with a traumatic demise of these Harappan citizens, or their aggressors, has been based upon the mode of disorderly disposal of the dead at Mohenjo-daro — essentially an archaeological datum — rather than upon the skeletal evidence of the trauma: the critical biological datum. In certain cases, where individual skeletons are described as bearing the marks of inflicted cuts and blows, the possibility that such damage originated with post-mortem erosional causes has not been considered. Furthermore, earlier investigators overlooked some very striking marks of pathological stress recorded on skulls and post-cranial bones of the reputed massacre victims. The present paper is a reassessment of the massacre thesis and a discussion of some of the pathological features found in Harappan skeletal series. The social implications of these factors of trauma and disease are discussed in the the light of recent investigations conducted by the author in India and Pakistan.

History Of The Massacre Thesis

At present 42 human skeletons have been collected from Mohenjo-daro of which 5 are in Pakistan where they were collected after 1947. The bulk of the Mohenjo-daro skeletal series is housed in the Anthropological Survey of India, Calcutta, along with other Harappan skeletal series from Harappa, Chanhu-daro, Lothal, Kalibangan and Ropar. Whereas the skeletons from these latter sites are associated with cemeteries, the Mohenjo-daro skeletons were collected from several localities within buildings and along streets of the ancient city. If a cemetery did exist at Mohenjo-daro, it has yet to be found. This apparent absence of formal mortuary areas has constituted one important component of the massacre scenario.

A second, and more significant element of the thesis, is the circumstance of apparent haphazard disposal of the dead. When first observed *in situ*, none of the skeletons was laid out in any orderly way with limbs composed beside the axial plane of the body. In 1931, Marshall (1931: 1: 79-81, 107-108, 184-186, 222-223) reported that 21 human skeletons had been discovered of which 14 (13 males and females and 1 child) where found in Room 74 of House V in the HR Area, Section B. Six additional skeletons were found in Lane 4 between Houses XVIII and XXXIII in the VS Area. A single skeleton came from the Deadman Lane of the HR Area, Section A. Thus 7 skeletons were excavated from public streets and the remainder in a ruined chamber.

This same state of disarray of the burials was reported by Mackay (1938: 1: 116-118) in his study of Mohenjo-daro excavations conducted in 1928-1929. The majority of the skeletons recovered in that season's work were from the DK Area, G Section, the southern portion of which revealed some skeletons resting on a wall which constituted the southern side of the Long Lane and south of the water-chute outside House

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

II of Block 11. The levels of burial were 5.6 to 6.9 m below the datum point and 1.8 m below ground surface. Mackay encountered a second group of skeletons in Block 8A on a staircase leading down into the well-room 42 from the east and hardly a metre below ground surface. Out of his total series of 15 skeletons, 9 were from the Long Lane, 4 from the well-room, and 1 beneath the debris of Block 7 and another single specimen in the north-west corner of the Western Courtyard of Block 1. Again these included adult males and females and children.

In 1964, on the second day of his excavation of the western border of the HR Area, Dales (1965) unearthed 5 skeletons between the walls of the latest cultural period and in an accumulation of fallen bricks, ash and shatterd pottery. The skeletons lay at a dog-leg bend of a lane and were identified as 3 males, 1 female and 1 child. These, too, were not in ritualized burial posturers.

Marshall attributed the disposal of the dead at Mohenjo-daro to causes related to plague, famine and sudden death. Mackay, who regarded all skeletons of his series to belong to a late Indus Valley period, suggested that these individuals had been slain by raiders while attempting to escape from the city during a military attack. To his statement that the bodies appear to have been 'thrown pell-mell into a hurriedly made pit' he admitted the qualifier that he was unable to discern walls for such a pit. This is the only group of Mohenjo-daro skeletons which Mackay and others have thought to have been deliberately covered by earth and debris shortly after the reputed tragedy had occurred. Dales echoed this claim that a traumatic event had taken place with respect to this discoveries of 1965: the skeletons 'were not buried in any normal way but victims of some disaster'. In this way, the massacre thesis was proposed by the archaeological investigators of Mohenjo-daro.

This archaeological interpretation of dispersed and disorderly disposition of the dead was taken up by Sewell and Guha (1931) when they described the physical characteristics of Marshall's series. Specimens receiving particular attention with respect to trauma included the following:

Skeleton 1. This was described as a very young adult female who had suffered a fracture probably caused by a cut at a place on her skull some 11 mm. anterior to bregma on the frontal bone. However, the healing is complete and only a longitudinal depression marks the area of the trauma. Sewell and Guha noted that this individual may be a more recent specimen than the others in the series. If this is true, it does not relate to the massacre thesis, particularly for the reason that the lesion has healed completely!

Skeleton 2. A fracture on the left temporal-parietal region of the skull was noted for this young adult male.

Skeleton 6. A reputed cut across the right parietal bone of this young adult male was ascribed to a blow from a sharp weapon, such as a sword, which was the immediate cause of death. The fracture measures 145 mm in length.

Skeleton 10. A reputed cut on the posterior aspect of the cranial vault and extending to the right side of the sagittal suture was attributed to a blow inflicted upon this female of late middle-age.

The same theme of a tragedy was continued by Guha in collaboration with Basu (Guha and Basu 1938) in their description of the physical characteristics of the skeletons of Mackay's series. They gave particular attention to 2 specimens.

Skeleton DK7411 (M.27). This adult male suffered a large depressed fracture some 140 mm. by 30 mm. in extent on the left side of the cranial vault commencing 18 mm. from bregma and continuing across the left frontal-parietal region to the left mastoid process

Skeleton DK 7829A (M. 32). This was described as a decapitated individual, a child or young adolescent.

The most ardent proponent of the massacre thesis was Wheeler (1952, 1968) who uncritically accepted the claims of the anthropologists that fractures on the skulls of several Mohenjo-daro skeletons were diagnostic of wound marks relating directly to the cause of death. Wheeler carried the scenario further with his proposal that the massacre was a specific event in Late Harappan times when foreign invaders sacked Mohenjo-daro and liquidated its citizens. He identified these aggressions with the Aryan horde.

In his statements of 1968 in the third edition of *The Indus Civilization*, Wheeler notes that 17 of the Mohenjo-daro skeletons belong to the latest occupation of the city, but the rest were found under inconsistent circumstances. However, he adds:

We have here in fact the vestiges of a final massacre, after which Mohenjo-daro ceased to exist. Who were the destroyers? We shall not know. It may be that some hill-tribe fell upon the enfeebled city and put it to the sword. Years ago I suggested a more historic environment, and record it again here as a *jeu d'esprit*, without emphasis since it is sustained by no positive evidence . . . . During the second millennium B.C. Aryan speaking peoples invaded the Land of the Seven Rivers, the Punjab and its neighbouring region. It has long been accepted that the tradition of this invasion is reflected in the older hymns of the Rigveda, the composition of which is

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

attributed to the second half of the millennium. In the Rigveda, the invasion constantly assumes the form of an onslaught upon the walled cities of the aborigines . . . . If we reject the identification of the fortified citadels of the Harappans with those which the Vedic Aryans destroyed, we have to assume that, in the short interval which can, at the most, have intervened between the end of the Indus civilisation and the first Aryan invasions, an unidentified but formidable civilisation arose in the same region and presented an extensive fortified front to the invaders. It seems better, as the evidence stands, to accept the identification and to suppose that the Harappans of the Indus valley in their decadence, in or about the seventeen centry B.C., fell before the advancing Aryans in such fashion as the Vedic hymns proclaim[1]

Archaeological Reassessment Of The Thesis

The first significant challenge to the events described by Wheeler, with respect to both the disposition of the skeletons at Mohenjo-daro and the catastrophically abrupt end of Harappan culture, appeared in 1964. Dales (1964), while impressed with the disorderly circumstances of disposal of the dead he encounterd in his excavations at Mohenjo-daro in the mid-1960s, noted that the skeletons of his series as well as those collected earlier into the series of Marshall's and Mackay's did not come from ɔ single archaeological time-frame. Indeed, their deposits varied chronologically to a considerable degree: some are datable to a mature Harappan phase, others are of later antiquity or of uncertain temporal and cultural context. Thus, it is unlikely that a case can be urged for a *single* tragedy.

Dales also observed that the kinds of evidence usually associated with a military action are absent at Mohenjo-daro. No arms or armour were found in the vicinity of the skeletons. Nor can it be established that these are the corporeal remains of victims of formalized executions or sacrifices of a ritualized nature.

Finally, the notion that these skeletons were associated with Aryans finds no support in Dales' view. He noted the temporal discrepency between the archaeological data regarding Harappan decline and the generally accepted dates of the earliest Aryan presence in South Asia which have been based upon literary and oral traditions. This is an hiatus of several centuries, although this was casually recognized by Wheeler in his paper of 1952. To these reconsiderations of the massacre thesis should be added the problem of determining whether the skeletons, if victims of a tragedy, were citizens of Mohenjo-daro or the slain among the invading horde, Aryan or of some other stock.

While Dales' re-evaluation of the archaeological data in support of a massacre has found general, if not especially enthusiastic, positive response from his colleagues in India and abroad, what appears to have been overlooked is the requirement of determining if the skeletons do or do not reveal indisputable marks of traumatic stress. The proof or disproof of the massacre thesis depends upon the biological issue, and the interpretations of Guha and his colleagues which were put forward in the 1930s deserve review in the light of new data and analytical procedures which have been developing in the fields of forensic anthropology and palaeopathology.

Biological Reassessment Of The Thesis

In 1977, the author was privileged to examine the Harappan skeletal remains recoverd in Pakistan since partition, and in 1964 and 1980 to examine the series retained in India. In the course of a broad-ranged morphometric and palaeodemographic study, particular attention was given to the condition of preservation of the specimens, the evaluation of the massacre thesis, and examination of bones and teeth for signs of trauma and pathology.

This interest in accurate determination of marks of injury and disease has been stimulated by work conducted over a number of years in the capacity of consultant to medico-legal and law enforcement agencies in the author's country. Cases involving identification of human remains with respect to finding missing persons or sorting out parts of a body in situations of mass disasters may involve the determination of the presence or absence of old or recent characteristic marks of stress on bone, teeth and soft tissues. When present, marks of injury are quite specific in their appearance, both microscopic and macroscopic analyses revealing tell-tale features which are not to be confused with abrasions or other marks of erosional and post-mortem origin. The study of wound marks has emerged as an exacting science, and the establishment of the existence of these in the case of recent deceased individuals is one step in the initiation of legal procedures investigating circumstances involving foul-play. To be sure, individuals victimized by trauma may not bear the marks of their assailant or his weapons on their skeletal tissues (as with cases of drowning, strangulation, poisoning, cardiac

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

arrest due to fright, etc.); but in cases of genocide where multiple victims are involved, it is usual for some individuals of a group to reveal marks of traumatic stress on their bones and teeth. Certainly this is to be expected in conventional circumstances of military engagements, mass executions and ritual sacrifices. The archaeological record offers some outstanding examples of each of these grisly events of which some within the historical period can be documented with written accounts. Quite often the forensic anthropologist is able to accurately specify the kind of weapon used in the infliction of a given wound penetrating to the skeletal structures. The forensic methods in current use were applied to the study of the entire skeletal series from Mohenjo-daro as well as to the series from other Harappan sites.

It was observed, at the outset of these analyses, that several selective factors of sampling have characterized earlier studies. Of the 150 or more known sites of the Harappan culture, 5 are remnants of urban centres. All of these have yielded skeletal remains which, in addition to skeletons from two non-urban sites, constitute a series of over 400 individuals. Coming as it does from several temporal contexts (even within a single site) and from across immense spatial distances, this total sample is very heterogeneous. Some post-mortem damage to skeletal materials, due to disintegration of bone from interment or from the effects of mortuary rites involving primary and secondary burials in open and urn graves, has tended to discourage investigators from including more than a fraction of the total number of specimens associated with Harappan culture. For example, in the biological study of 265 individuals represented in the mortuary series from Harappan, only 72 specimens were examined (Chatterjee and Kumar 1962, 1963a). Another biological study of skeletons from Mohenjo-daro employed only 17 out of 42 available specimens (Cappieri 1970).

Related to this trend to include only the more completely preserved skeletons in descriptions of the Harappan population is the fact that almost all of the published studies are morphometric analyses of crania directed to the question of establishing the racial and physical characteristics of the ancient inhabitants of the cities and towns (Guha and Basu 1938; Gupta, Dutta and Basu 1962; Sewell and Guha 1931), to determining their degree of genetic homogeneity or heterogeneity (Bartel 1979; Dutta 1972, 1975a, 1975b), and to discovering their biological affinities to other ancient skeletal series or to contemporary human populations (Chatterjee and Kumar 1962, 1963a, 1963b; Krogman and Sassman 1943; Sarkar 1964, 1972). Valuable as these approaches to the skeletal biology of the ancient Harappans may be, the very dependency of significant morphometric and statistical analyses upon samples of relatively good states of preservation has led to a neglect of the less complete specimens in the series. All specimens merit re-examination in the course of applying modern palaeodemographic methods to the resolution of questions about the health status and record of injuries of these people. A step in the right direction has been undertaken already with Datta's (1962) demographic study. Sharma's (1972, 1979) work with the Kalibangan series, and some other investigators have looked to the entire series for answers to demographic questions (Kennedy 1969, 1981a, 1981b; Lukacs 1981; Pal 1976).

In the researches carried out in 1964 and 1980 which are referred to above, the author observed with special attention, those skeletal specimens set aside by Guha and his collaborators as bearing signs of trauma. Our comments are summarized as follows.

Marshall Series

Skeleton 1. A healed lesion does appear on the frontal bone of this specimen, as described by Sewell and Guha. However, it is likely to be a skeleton of more recent date than others in the series and its relevance to the massacre thesis is *nil*.

Skeleton 2. No sign of trauma can be observed today on this specimen which has been thoroughly restored in so far as its cranium is heavily coated with layers of shallac and other preservatives applied in the field and later in the laboratory. This treatment has led to the obscuring of many physical features which may have been observed when the specimen was *in situ*.

Skeleton 6. There is no evidence of traumatic injury, but there has been severe erosional damage extending from the right parietal bone across the occipital bone and on to the left parietal portion of the vault. Examination of the edges of this fracture does not lead to a diagnosis

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

that it was caused by a blow to either side of the head. The break is related, rather, to the post-mortem distortion of the skull which also involves warping and slight dislocation of some bones.

211 Skeleton 10. There is positive evidence of trauma on the posterior aspect of the cranium. A fracture extends from the occipital bone to the right side of the sagittal suture, as described by Sewell and Guha. However, these investigators failed to note that the "cut" is *not fresh and its margins are characterized by considerable bone resorption* which can be seen under low magnification. While this fracture may have been related to the cause of death of this individual, death was most certainly not immediately following the blow that caused the break, nor is it likely that this wound had been received at the place the skeleton was found by Marshall. The degree of bone resorption indicates a passage of from 30 to 70 days from the time of administration of the wound to the time of death of the victim. Unmentioned by Sewell and Guha is a depressed area along the junction of the right squamous temporal suture and parietal suture which has very sharp margins and is of obvious erosional origin.

Mackay Series

Skeleton DK 7411 (M.27). This is the *single case* where trauma is evident and in all probability was the cause of immediate death. The large depressed area extending from the left frontal-parietal region to the left mastoid process is of a completely different form from a fracture formed by erosional causes.

Skeleton DK 7829 A (M.32). There is no evidence of beheading of this individual, either on inspection of the skull or the attached cervical vertebrae. Guha and Basu assumed decapitation because the head was found separated from the postcranial bones of the specimen, a not unprecedented fact of post-mortem preservation encountered with some other Mohenjo-daro specimens. Decapitation marks are quite distinctive on the area of the cranial base and occipital region and, more particularly, on the 3rd to 6th cervical vertebrae. These marks are absent in this specimen.

Dales Series

No evidence of trauma was observed by the author on any of the specimens housed at the Department of Archaeology, Karachi, or at the archaeological museums at Mohenjo-daro and Harappa.

For the reasons offered above, the massacre thesis does not stand on the basis of the skeletal record itself. There is only one specimen (Skeleton DK 7829A M.32) which exhibits irrefutable signs of death by trauma, and its presence alone cannot serve to substantiate the notion of the massacre described by earlier investigators. Rather, our evidence goes far to justify Dales' reservations about the whole affair which he quite properly, in our thinking, refers to as a myth. It is undeniable that the Mohenjo-daro skeletons were first encountered by archaeologists under circumstances of informal burial, and the cultural implications of this are discussed in the latter part of this paper.

Evidence of Pathology in Harappan Skeletal Series

In an important paper published in 1969 in the *British Medical Journal*, Dutta (1969) discusses the palaeopathological implications of the bilateral thinning of parietal bones in an Harappan skull he had examined. This condition, when thinning of the bones of the cranial vault is restricted to the outer table of compact osseous tissue and combined with porosity or the 'punched-out' appearance of these ectocranial plates and extensive remodelling of postcranial bones, is diagnostic of a chronic state of anaemia for the individual.[2] In itself, this syndrome is not necessarily the cause of death. The condition was noted first by Hrdlicka in 1913 when he coined the term *symmetrical osteoporosis* to describe the sieve-like porosity of the outer surfaces of some pre-Columbian skulls from Peru. Angel (1966, 1967) has referred to this condition as *porotic hyperostosis*, and more recently Steinboch (1976) favours the term *spongy hyperostosis*.

Our re-investigation of the skeletons from Mohenjo-daro revealed that varying degrees of porotic hyperostosis modification appear in 210
Skeletons 6, 7, 8, 11, 14, 19 and M of the Marshall series. This condition was not reported by Sewell and Guha who first examined these and other specimens of that series. Similarly its presence was overlooked by Guha and Basu and later students of Harappan skeletal biology. The author's investigations of other Harappan series

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

in India and Pakistan showed that porotic hyperostosis was not a condition confined to the ancient citizens of Moehnjo-daro. It appears in a frequency as high as 25 per cent of the total Harappan sample investigated in 1964, 1977 and 1980. Its presence is documented now for individuals of both sexes and of ages from infancy to advanced age.

The porous deformity is caused by presssure atrophy introduced by hypertrophy of the hematopoietic diploic tissue between the external and internal tables of the bones of the cranial vault. The cribiform appearance is brought about by the complete destruction of the external or ectocranical table and hypotrophied cancellous bone. Thus the cranial vault is thicker in the affected area than in normal: the hypertrophied bone protrudes over the normal contour of the skull. However, the absolute thickness of the external table is itself reduced by its sieve-like modification. Postcranially, there occurs an hypertrophied alteration of bone marrow beginning in infancy or childhood as more red blood cells are produced to compensate for the higher turnover rate of abnormal red cells caused by the anaemic condition.

Various explanations for porosity of bone tissue have been proposed. Rickets, calcium deficiency, toxic and hormonal disturbances and even congenital syphilis were thought at one time to have been the causes. But it was in 1930 that the etiology of porotic hyperostosis was explained by Hooton who had compared radiograms of skulls of children and older individuals from Pecos Pueblo and from the Sacred Cenote at Chichen Itza. These radiograms were, in turn, compared with radiograms of living children suffering from thalassaemia major. Hooton noted their close similarity of the 'hair-on-end' appearance of the diploë, a diagnostic feature of this hereditary disease causing severe anaemia (Hooton 1930). Moore (1929) compared, at this same time,the bone changes of sickle cell anaemia on skulls of living or recently deceased individuals with pre-Columbian Mayan cranial material. Today we recognize that the hair-on-end feature appears in a number of other pathological conditions in addition to thalassaemia and sicklaemia. Among the other haemotologic disorders with hair-on-end are hereditary spherocytosis, hereditary elliptocytosis, and thalassaemia minor. Non-inheritable disorders, such as iron deficiency, produce similar changes in bone. Still other possibilities are G6PD deficiency, pyruvate kinase deficiency, congenital haemolytic jaundice and hereditary nonspherocytic haemolytic anaemia. Rarer possibilities include cyanotic congenital heart disease and polycythaemia vera in childhood.

Given this range of pathological conditions associated with porotic hyperostosis, it is important to determine which, if any, are most likely to be applicable to the ancient specimens from Harappan skeletal series. A decision may be reached after reviewing the major diagnostic features of the principal anaemias and determining their frequencies in the sample of Harappan specimens we have examined.

Thalassaemia (Cooley's anaemia, Mediterranean disease, erythroblastic anaemia) is the phenotypic expression of one or several mutant genes which lead to amino acid substitution in either the *alpha* or *beta* chains of the haemoglobin molecule. Thalassaemia minor is the condition of individuals heterozygous for the condition: thalassaemia major refers to homozygous individuals. Changes occur most frequently in the frontal bone and less often on the occipital bone. The facial region may also be involved, especially the maxilla and sphenoid bones, because of changes in the paranasal sinus. If the condition is advanced, there may be marked retardation of pneumatization and even maxillary and mandibular malocclusion. There may be extensive remodelling of postcranial bones due to marrow hyperplasia.

Sicklaemia (sickle cell anaemia) is an inherited condition of homozygous haemoglobin S gene plus the abnormal haemoglobins C and E genes which are polymorphisms of S. The S abnormal haemoglobin is most common in people of sub-Saharan African descent, but it does appear elsewhere in the world where haemoglobins C and E are more common. Bone changes in the skull and postcranial bones are due to marrow hyperplasia as a response to the body's effort to produce more red blood cells. But, combined with this reaction, is a process of thrombosis or blood clotting which occurs most often in long bones. What happens is that when the abnormal red blood cells assume an attenuated or elongated shape in response to trauma,they have difficulty in passing through capillaries. As a consequence, blood status occurs. Clot activating substances are freed

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and this brings about blood coagulation. Thrombosis inhibits the movement of nutrients through the blood stream and aseptic necrosis may result. These are important diagnostic features of sicklaemia. The hair-on-end feature of the skull is less obvious in sicklaemia than in thalassaemia,occurring in only 5 per cent of cases of sickle cell disease. The frontal bone is the first to be affected, but there is no significant facial or sinus modification. Thrombosis does not affect the skull in the same way it does the postcranial bones. Advanced stages of sicklaemia are marked by porotic hyperostosis of both the frontal and parietal bones of both children and adults. A final diagnostic feature of sicklaemia is the fact that sufferers of this disease are susceptible to osteomyelitis which may spread to the entire surface of a bone. This is to be distinguished from the thromobisis effect as it is not an aseptic necrosis of the epiphyses so commonly seen in cases of thalassaemia.

The most frequently observed form of anaemia is iron deficiency, a nutritional rather than an hereditary disorder. While resembling thalassaemia in some of its skeletal manifestations, it is etiologically quite different since it involves the inability to absorb iron from the gut, the excessive loss of iron from the body, or disturbances of iron metabolism by infection. Chronic deficiencies of amino acids and minerals may cause this disorder as well. Changes in the skull are localized in the occipital region. There is no retardation of pneumatization of maxillary sinuses. Nor are postcranial bones affected in any obvious way, save for the humeral-radio-ulnar joint which may bear signs of osteoporosis. Thrombosis modifications are absent and vertebral compression and vertebral osteoporosis are absent. Bone changes of the skull may occur in infancy or in adulthood.

All of these anaemia responses must be distinguished from those bone changes wrought by rickets, although rickets may be found in individuals suffering from any of the above-mentioned genetic or nutritional disorders. Rickets, a nutritional disease,leads to a pronounced bulbous development of the frontal bone,bowing of limb bones, flaring of the ends of diaphyses, and shortening of the shafts. Hookworm is still another cause of anaemia and appears in varying frequencies in populations in the tropical belt.

In the sample of Harappan skeletons examined in connection with the present study, porotic hyperostosis appears consistently on the parietal bones and frontal bones and there are three cases in every ten where the maxilla exhibits this condition. In no case do we encounter porotic hyperostosis of the occipital bone by itself, in a single case where the occipital bone does show porosity, the same modifications occur on the frontal and parietal bones as well. The hair-on-end condition appears in very low frequency in our sample, i.e. in only 3 per cent. From these data, which were collected from specimens of both sexes and ranging in age at time of death from 12 years to advanced middle age,it may be concluded that either thalassaemia or sicklaemia or both pathological conditions were present in the Harappan population. It is highly unlikely that the anaemias associated with hookworm and iron deficiency are represented in any significant frequency in the sample, as their diagnostic features do not appear. Additional research on the postcranial bones may allow us to be more specific as to which of the hereditary disorders we have noted is paramount in the population. As Steinboch (1976) correctly observess, crania alone do not provide complete evidence for making a distinction between thalassaemia and sicklaemia or between these and other anaemic disorders. But the present evidence goes far to demonstrate that one or both of these conditions relating to inheritence of abnormal haemoglobins was present in the Harappan population.

What is of greater interest than this diagnosis of pathological variables among the ancient peoples of the Indus and their outpost settlements, is the implication it holds for evidence of malaria in the same population. As early as 1949, Haldane suggested that the mutant genes causing thalassaemia and sicklaemia and other haemolytic anaemias were balanced polymorphisms of relatively stable genetic frequencies. This was pursued by Allison (1954) who noted that the highest frequencies of these diseases appear in geographical regions where malaria infection is endemic. People heterozygous for thalassaemia and sicklaemia possess an inbuilt natural resistence to malaria. Later, it was recognized, by other workers that this resistence is due to the short life-spans of the red cells in these heterozygotes which inhibit or prevent malaria parasites from maintaining long-term infections in the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

circulatory system.

The initial studies of the relationship of the abnormal haemoglobins & malaria were based upon surveys of living populations. It was found that the more malignant form of *Plasmodium falciparum* malaria was associated with populations with high sickle polymorphism and that homozygous (SS) individuals for the trait were at a severe selective disadvantage when compared to the heterozygous (Ss) individuals. Furthermore, hyterozygous females have a higher rate of fertility than do homozygous females. Cavalli-Sforza and Bodman (1971: 148-171) suggest that this mutation may have risen independently in Africa, the Mediterranean basin and in Central Asia. If this were the case, then widely dispersed or geographically separated human populations may share the trait as an evolutionary parallelism and not necessarily because of ancient or recent ethnic affinities between the peoples of one continent with the inhabitants of another land mass. These investigators point out that correlation of the abnormal haemoglobins and malaria will never be exact across space and time for the reasons that populations migrate, there may be fluctuations in the intensities of malaria infection, new genetic adaptations may arise over the centuries, and other adaptations to resist malaria may be already present in a population. The latter explanation may well apply to the natives of the Americas where malaria has been endemic for centuries but where evidence for thalassaemia and sicklaemia in pre-Columbian times is essentially lacking. Porotic hyperostosis appears in the crania and postcranial bones of New World Indians, as Hrdlicka discovered earlier in this century. However, it has not been established that its presence is due to all the same disorders that are encountered in the Old World.

In India today, the sickle cell gene attains a frequency of 5-10 per cent in the central part of the Deccan plateau, rises to 15-20 per cent in the southernmost part of the peninsula, and drops to less than 5 per cent in Assam and Burma. This distribution coincides quite well with the broad distribution of *falciparum* malaria in India before 1930. In the north-western borders of the country and into Pakistan and Afghanistan, the sickling gene ranges from 5-20 per cent in local areas today (Cavalli-Sforza 1971). Distribution maps for Africa show the sickle cell gene is an high as 30 per cent in local areas of Liberia and across the Equatorial belt, i.e. some 30 per cent of the populations in this region are heterozygotes and homozygotes may be as high as 2.5 per cent at birth.

The relevance of these considerations to the ancient Harappans is directly associated with the work of Angel (1966, 1971 1978; Cockburn 1976: Zuleuta and Bruce-Chwatt 1980) whose examination of skeletons of children and adults of early Neolithic (6500 B.C.) and Bronze Age peoples of the Aegean revealed relatively high frequencies of porotic hyperostosis resembling thalassaemia. Angel suggested that this was indicative of malaria in this part of the world in these earlier times. Both malaria and thalassaemia are present in Greece and neighbouring countries today, and it is possible that the origin of this adaptive polymorphism dates back to Upper Palaeolithic times in the Mediterranean area. Porotic hyperostosis shows up as well in Bronze Age Wales, Mesolithic Nubia, and pre-Dynastic Egypt.

When these data are applied to questions of the health profile of the ancient peoples of the Indus, we feel confident in associating the frequencies of porotic hyperostosis encountered in examination of Harappan skeletal materials with the types of hereditary abnormal haemoglobins described above. Furthermore, the probability is high that these diagnostic markers of thalassaemia and sicklaemia are associated with endemic malaria as a balanced polymorphism in ancient times in Harappan settlements just as this situation exists today in the Indian subcontinent. A very strong argument that we may be able to document the antiquity of malaria in the South Asian land mass is afforded by our examination of the skeletons of pre-Harappan, i.e. Mesolithic temporal or cultural context in this part of the world. With one exception known to the author, Mesolithic human skeletal remains in India and Sri Lanka do not exhibit porotic hyperostosis, thromboses of postcranial bones or marrow hyperplasia and osteomyelitis[3]. Whatever the date of mutation of the genes for haemolytic disorders may be for the Mediterranean basin and Nilotic Africa, its manifestation in the Indian subcontinent would appear, on the basis of present biological evidence, to be somewhat later.

In concluding this discussion of disease in Harappan populations, it must be emphasized that the subjects touched upon here represent a

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

very limited part of the large issue of the health status of these ancient people. Further research on this subjects must give greater attention to postcranial bones, as there seems to have been a craniocentric bias in Indian palaeopathology. But even with cranial material, the study of dental disease has only begun (Lukacs 1981), and we remain essentially ignorant of the biological parameters of nutritional development and general ontogenetic potentials of these ancient people.[4] The Harappan skeletal series is sufficiently rich to provide future investigations with a harvest of exciting research problems focusing upon the identification and significance of ancient diseases and their implications for reconstructing the life-ways of the architects of the Harappan cultural achievement. This latter topic is treated briefly in the conclusion of the present study.

CONCLUSIONS

Social Implications Of Trauma And Disease For Harappan Culture

This paper is concerned with two forms of biological stress which are intrinsic to the human condition but are evident in unique ways in the Bronze Age Harappans. These stressors of trauma and disease represent threats to the integrity of the body's constitution and functions, and when assaults to the *status quo* exceed the limits of an organism's adaptability to produce a successful response, the ultimate consequence is death. Over the course of human evolution, myriad inbuilt structural and metabolic adaptations have developed which have survival value. Markers of some stressors, particularly those of injury and disease appear in the hard part of the body and in the form of preserved skeletal remains. These markers are of interest to students of prehistoric populations. This paper focuses upon: (1) the massacre thesis which has been proposed by earlier investigators to account for the disposition of human remains found at Mohenjo-daro, and (2) the evidence for endemic malaria and the haemolytic diseases of thalassaemia and sicklaemia in the broader scope of ancient Harappan skeletal series in which porotic hyperostosis is evident.

On the basis of our re-examination of the skeletal remains from Mohenjo-daro, we find little reason to agree with Marshall, Mackay and Wheeler or with Guha and his collaborators that the majority of Mohenjo-daro skeletons testify to some kind of military assault, mass execution or human sacrifice. The reputed wound marks, with *211* a single exception known to the author, appear to be of erosional origin or are cases of healed or successfully healing lesions unrelated to circumstances and places of burial. However, the disarray of these skeletons is indisputable from the archaeological evidence, and it remains to determine the causes why bodies would have been discarded in apparently irreverent and haphazard ways over an extended period of time in the history of the city's occupation, as well as in separate parts of the same city. Perhaps we shall never have a definitive answer to this question, but a single massacre may be excluded as a valid explanation. Certainly the deposits which have yielded skeletons at Mohenjo-daro lack any of the archaeological traits of known massacre sites of later times for which an historical record may be present.

One is struck by cultural parallels of disorderly burials from other parts of the world and from different periods of human history and prehistory. Mohenjo-daro is not unique in providing scenes of skeletons of children and adults of both sexes which have been hastily and informally cast way, abandoned and left unaccompained by funerary goods. For example, such was a common practice in medieval European plague pits into which the infected dead were cast. The repositories might be abandoned buildings or crypts within the foundations of churches.

The Harappans were mindful of hygienic descipline, as the ruins of their drains and public sanitary systems testify, and victims of epidemics may have been buried in those parts of the city where they had lived instead of being removed to common burial grounds after death. Portions of an urban centre no longer inhabited qualified as well as places for disposal of the dead in the Middle Ages of Europe and Western Asia. But plagues or other diseases of epidemic proportions are not the only considerations here, and it may well be the case that the deceased of Mohenjo-daro, whatever the causes of death may have been, were discarded in lanes, well-rooms and chambers which were unteneted by the living for reasons having to do more with demographic and social factors than with pathology. The fact that the Mohenjo-daro skeletons are phenotypically

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

similar to other Harappans, as established by morphometric and statistical analyses, goes far to argue against any theory that they were foreigners or biologically distinctive ethnic isolates. However, their mode of burial does suggest that some set or sets of circumstances were operative which requires the relegation of their bodies to mortuary practices quite different from those encountered in other centres of Harappan settlement. At present we may conclude that Mohenjo-daro has provided several examples of casual burial of human bodiers, but no firm evidence of either an archaeological or biological nature exists to indicate that this practice was related to single or multiple massacre events.

The relationship of porotic hyperostosis to several anaemic disorders is well established in many parts of the world today. The inherited haemolytic disorders of thalassaemia and sicklaemia and their association with malaria as a balanced polymorphism is equally well known in some parts of the world today, including South Asia. The suggestion that these pathological variables existed in Bronze Age Harappan centres as they most probably did in the Aegean world of the Bronze Age brings forth some interesting implications for reconstruction of certain feature of social organization in the cities of the Indus.

It is understood that the *Anopheles* mosquito is the host of the *Plasdmodium* parasite, and that this carrier achieves highest fertility rates in undrained regions, as in areas with stagnant ponds or abandoned irrigation channels. In Africa, the slash and burn methods of Neolithic garden agriculture continues to the present day in some regions, and this has contributed singly to the increase in *Anopheles*. Similarly, the ponding effects of landlocked water along the Indus and other rivers of the Harappan domain would have been conducive for the propagation of endemic malaria. Failure to drain swamps or to maintain any form of irrigation system would have been a further contributing factor. Formal irrigation systems are not necessarily involved, for the flooding of the Nile or the Indus leaves in its wake the ideal breeding sites for malaria-borne hosts. The unquestionable deterioration of civic standards in the latter phases of Mohenjo-daro, and the intermittent recurrences of abnormal and devastating floods' of which Wheeler (1968: 129) laments would provide the social setting for virulent and endemic malaria. Although it would be a careless overstatement to speculate that malaria, or any other pathogenic condition, was a cause of the Harappan decline, the toll of such stresses on a society are felt nevertheless in the demographic shifts in numbers of men employable as labourers or capable of bearing arms at any given time in defence of the state. Thus the question of pathology in earlier times is appropriate to issues concerning the social life of extinct societies, and both the archaeological and skeletal records are required for this exercise[5].

This contribution of a report of recent research to a volume commemorating the late Sir Mortimer Wheeler and in recognition of his insights into the Harappan life-way will serve its purpose if it initiates a dialogue between his successors working today in the fields of archaeology and physical anthropology.

ACKNOWLEDGEMENTS

The author is grateful to Drs. H. Rakshit, A. Basu, P.C. Dutta, A. Pal, I. Khan and M. Halim, and the late Dr. D. Sen and Mr. C.B. Burrow. Also the several American foundations. the several American foundatons of the National Science Foundation and the American Institute of Indian Studies are thanked for their financial support.

NOTES

1. It is, perhaps, Wheeler's graphic description of a massacre at Mohenjo-daro as he understood it to have taken place which has exerted a more profound influence upon the thinking of later archaeologists than any archaeological evidence he produced in persuading his hearers that a tragedy was the final event of Mohenjo-daro's history. In a popular book of 1959 Wheeler writes.

> That final blow has often enough been described. It is represented by groups of skeletons — men, women and children, some bearing axe-or sword-cuts — which have been found lying on the topmost level in the sprawled or contorted positions in which they fell. They had been left there by raiders who had no further use for the city which they had stormed. In that moment Mohenjo-daro was dead . . . .It must not be forgotten that Mohenjo-daro is the only place where clear material evidence of final massacre is at present forthcoming. (Wheeler 1959: 113-114).

2. Dutta was not describing the patterns of porotic hyperostosis encountered by the present author, although Dutta's specimen of a middle-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

aged female from the cemetery of R37 at Harappa exhibits some osteoporotic modifications of parietal thinning. He attributes this case to a lesion which had undergone healing and was subsequently punctured by postmortem damage. He also concludes from a comparative study of two patients, a female of 85 years and a male of 28 years, that 'the thinning may be an acquired and progressive disease (progression was diagnosed in the female), and the localized thinning is explained in terms of decreased osteoblastic activity resulted from gonadal insufficiency, senility or other causes of osteoporosis in a region where there is little stress or other strain (Dutta 1969: 55). In the same note, Dutta observes that the depressions at the sites of the two lesions are bilateral and symmetrical. The skull is normal in other respects and has a vault thickness of about 6 mm. He does not suggest that the lesion on either parietal was caused by trauma.

3. There is evidence of porotic hyperostosis on the frontal and parietal bones of the single Mesolithic skeleton from Baghai Khor, Mirzapur District, Uttar Pradesh. This was first observed by the author in 1980. While of Mesolithic cultural context, it is interesting to note that the Baghai Khor skeleton and its deposit is contemporary in time with the mature phase of the Harappan culture. The specimen is that of a female of young adult years. A detailed morphometric report of the skeletal remains from this site is now being prepared for publication by the author.

4. Preliminary studies of the nutritional status of ancient Harappans undertaken by the author suggest that they belonged to a relatively lower-statured and gracile phenotypic pattern, suffered from dental stresses of pathogenic nature, and may not have realized full ontogenetic development in a majority of cases. These features find parallels in other early urban centres of high culture in Western Asia and the Mediterranean basin. On the other hand, gross differentials of ontogenetic development are not detected, as is the case among skeletal series from pre-Columbian Meso-America, Dynastic Egypt and medieval Europe. The nutritional resource base may not have been the complete monopoly of the ruling elite at Harappan centres, as appears to have been the case in other parts of the ancient world where urbanization or central social organization were emerging. Further research should focus upon the evidence for dental hypoplasia and markers of arrested growth in postcranial bones of all human remains of the Harappan series.

5. It must be emphasized when considering the relationship of porotic hyperostosis to certain abnormal haemoglobins and malaria that the role of other genetic and non-genetic causes of bone alteration (which are noted above) be kept in mind. Indeed, it is highly improbable that the presence of porotic hyperostosis in a skeletal series of any size is the manifestation of only one agent of pathological stress . a critical tool in the diagnosis of specific pathologies
absolute frequency of porotic hyperostosis and its distribution by age in the mortuary population. The relatively high incidence of porotic hyperostosis in adults of the Mohenjo-daro series (admitedly representative of individuals from more than one generation) is higher than might be expected from a cause determined as sicklemia along for the reason that cranial and post-cranial markers of stress appear only in individual homozygous for the sickling trait. However, both homozygous and heterozygous carriers of the thalassemia gene manifest porotic hyperostosis and other expressions of bone remodeling of the skull and post-cranial skeleton. These data strenghthen any argument that thalassaemia was a significant adaptive polymorphism in the population of Mohenjo-daro. But such a conclusion does not rule out the importance of other pathogenic features in the series.

REFERENCES

Allison, A.D. 1954. Protection Offered by the sickle-cell Trait against Subtertian Malarial Infection. *British Medical Journal* 1: 1187-1979.

Angel, J.L. 1966. Porotic hyperostosis, Anaemias, Malaria and Marshes in the Prehistoric Eastern Mediterranean. *Science*. 153; 760-763.

———. 1967. Porotic Hyperostosis or Osteoporosis Symmetrica. In *Diseases in Anitiquity*. D.R. Browthwell and A.T. Sandison, ed. Springfield: Charles Thomas.

———. 1971. *Lerna, The People*. 2. Washington, D.C.: American School of Classical Studies at Athens and Smithsonian Institution Press.

Bartel, B. 1979. A Discriminant Analysis of Harappan Civilization: Human Populations. *Journal of Archaeological Science* 6: 49-61.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Cappieri, M. 1970. The Population of the Indus Civilization. *Field Research Projects Occassional Papers.* 11: 1-46.

Cavalli-Sforza, L. and Bodmer, W.F. 1971. *Genetics of Human Populations.* San Francisco: W.H. Freeman.

Chatterjee, B.K. and Kumar, G.D. 1962. Etude Comparee de Analyse Racial des Restes Humaines de Harappa, Pakistan Occidental. *Anthoropologie.* 66: 335-337.

———. 1963a. *Comparative Study and Racial Analysis of the Human Remains of Indus Valley Civilization with Particular Reference to Harappa.* Calcutta: Newman.

———. 1963b. Racial Elements in Post-Harappan Skeletal Remains at Lothal. In *Anthropology on the March.* B. Ratnam, ed. Madras: Social Science Association 104-110.

Cockburn, A. 1976. *Porotic hyperostoris: An enquiry.* Monograph of the Palaeopathology Association 2: 1-4.

Dales, G.F. 1964. The Mythical Massacre at Mohenjo-daro. *Expedition.* 6: 36-43.

———. 1965. New Investigations at Mohenjo-daro. *Archaeology.* 18:2.

Datta, J.M. 1962. *Demographic Notes on Harappa Skeletons.* Memoirs of the Anthropological Survey of India. 9: 1-12.

Dutta, P.C. 1969. Bilateral Parietal Thinning in Bronze Age Skull, *British Medical Journal.* 1:55.

———. 1972. The Bronze-Age Harappans: a Re-examination of the Skulls in the Context of the Population Concept. *American Journal of Physical Anthropology.* 3: 391-396.

——— 1974. Non-metrical Variation in the Cranial Material from Harappa. In *Indian Anthropology Today.* D.K. Sen, ed. Calcutta: Department of Anthropology, Calcutta University 103-113.

———. 1975a. Harappa People and the Contemporary World. In *Bio-anthropological Research in India.* H. Rakshit ed. Calcutta: Anthropological Survey of India 20-27.

———. 1975b. Race Concept and Palaeoanthropology: a Research Model for Interpreting Ancient Human Remains. *Anthropologie.* 13: 35-46.

Guha, B.A. and Basu, P.C. 1938. Report on the Human Remains Excavated at Mohenjo-daro in 1928-29. In *Further Excavations at Mohenjo-daro.* E.J.H. Mackay, ed. New Delhi: Government of India 1: 613:-638.

Gupta, P., Basu, A. and Dutta, P.C. 1962. *Human Skeletal Remains from Harappa.* Memoirs of the Anthropological Survey of India. 9: 13-188.

Hooton, E.A. 1930. *Indians of Pecos Pueblo.* Now Haven: Yale University Press.

Kennedy, K.A.R. 1969. Palaeodemography of India and Ceylon since 3000 B.C. *American Journal of Physical Anthropology.* 31: 315-320.

———. 1981a Skulls, Aryans and Flowing Drains: the Interface of Archaeology and Skeletal Biology in the study of the Harappan Civilization. Paper presented at the Seminar on Harappan Civilization, Srinagar, 1979 (in press).

———. 1981b When bones tell tales. *Archaeology* (January-February 1981) (in press).

Krogman, W.M. and Sassman, W.H. 1943. Skull found at Chanhu-daro. In *Chanhu-daro Excavations 1935-36,* E.J.H. Mackay, ed. New Haven: American Orientalist Society 252-263.

Lukacs, J.R. 1981. Dental Disease and Dietary Patterns of Ancient Harappans. Paper presented at the Seminar on Harappan Civilization, Srinagar, 1979 (in press).

Mackay, E.J.H., 1938. *Further Excavations at Mohenjo-daro.* New Delhi: Government of India.

Marshall, J., 1931. *Mohenjo-daro and the Indus Civilization.* London: Probsthain.

Moore, S. 1929. Bone Changes in Sickle Anaemia with a Note on Similar Changes in skulls of Ancient Mayan Indians. *Journal of the Missouri Medical Association.* 26: 561-564.

Pal, A. 1976. Ph. D. Thesis in the Department of Anthropology, Calcutta University (unpublished).

Sarkar, S.S 1964. *Ancient Races of Baluchistan, Punjab and Sind.* Calcutta: Bookland.

———. 1972. *Ancient Races of the Deccan.* New Delhi: Munshiram Manoharlal.

Sewell, R.B.S. and Guha, B.S. 1931. Human Remains. In *Mohenjo-daro and the Indus Civilization.* J. Marshall, ed. London: Probsthain 2: 599-684.

Sharma, A.K. 1972. Harappan Cemetery at Kalibangan: a Demographic Survey. *Proceedings of the Indian Archaeological Congress* Seminar Papers 4: 113-116.

———. 1979. Harappan Cemetery at Kalibangan: a Study, Paper presented at the Seminar on Harappan Civilization, Srinagar, 1979 (in press).

Steinboch, R.T. 1976. *Palaeopathological Diagnosis and Interpretation.* Springfield: Charles Thomas.

Wheeler, R.E.M. 1952. Archaeology and Transmission of Ideas, *Antiquity.* 26: 180-192.

———. 1959. *Early India and Pakistan* London: Thames and Hudson.

———. 1968. *The Indus Civilization.* 3rd ed. Cambridge: Cambridge University Press.

Zuleuta, J. de and Bruce-Chwatt L.J. 1980 *Rise and Fall of Malaria in Europe.* London: Oxford University Press.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

45

K.M. Srivastava

The Myth of Aryan Invasion of Harappan Towns

After completing the excavations at Brahmagiri in Chitradurg District of Karnataka, Wheeler turned his attention to Harappa in District Montgomery, now in Pakistan. In one of his visits to this site, Wheeler observed the remains of formidable 'defences'. In order to verify the nature of these defences he started fresh excavations in the 'citadel' of the township. Here he discovered the remains of a huge mud-brick structure which he thought belonged to the fortifications, primarily aimed at defending the township against military incursions. He repeatedly brought in the Sumerian analogies of Lagash and Ur to fortify his arguments (Wheeler 1947:76). As the next logical step in the reconstruction of the history of these defences, he found as it were, ready references in the *Rigveda*.[1] Picking up these references of warfare (1947:83) he made them speak in the light of his archaeological discoveries. To him (1968:132):

> It seems better, as the evidence stands, to accept the identification and to suppose that the Harappans of the Indus Valley in their decadence, in or about seventeenth century B.C., fell before the advancing Aryans in such fashion as the Vedic hymns proclaim.

The Myth Of Conquered Forts

Curiously enough, while propounding the theory of destruction of the Harappan towns as well as the Harappa culture by the invasion of the Aryans, Wheeler combined different kinds of evidence picked up selectively from different sites. Thus, he combined the evidence of skeletons found in a disorderly manner in the streets and houses of Mohenjo-daro with the so-called mud-brick defences of Harappa. Besides the fact that this is faulty methodology, the theory of the defence and Aryan invasion could be conceived only in war-like activities and the use of military weapons by the Harappans. And this has been highly questionable right from the time of Marshall (1931) who first proposed the invasion theory, though the invasion he had in mind was made by the Baluchi nomads and not by the Aryans. Wheeler himself has candidly admitted the absence of military outfit in Harappan towns (Wheeler 1968:73). Still he suggested that small domed pieces of copper, each perforated with two holes, were sewn on to a garment and used as an equivalent to mail (Wheeler 1968:73), but there is no supporting evidence and neither body-armour nor helmets (well known in Early Dynastic Sumer), nor indeed shields, can at present be attributed to the Harappans.

He further states (Wheeler 1968:72) that it is 'true, the military element does not loom large amongst the extant remains, but it must be remembered that at present we know almost nothing of the civilisation.' In fact the implements of copper found so far in the Harappan towns are, by and large, domestic in nature. Moreover, where are the remnants of the weapons of war supposed to have been used by the invading Aryans? Can their absence be justified in the case of the invaders as well? Similarly, if the invasion by the Aryans was the cause of the destruction of the Harappa culture, where are the remains of the Aryans at the Harappan sites? The Aryans can not be said to have destroyed the Harappans simply in a fit of temper or for the sake of plea-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

sure. The onslaught must have had a certain aim behind it and the principal aim of an invader is generally the occupation of the site, at least temporarily. The Aryans cannot be believed to have been interested only in collecting booty from various places and abandoning the site when it is clear from the Early Vedic literature that the *Saptasindhu* or the Punjab-Haryana region was their homeland. Indications of people, other than the Harappans, occupying the same site immediately after its destruction, in an almost overlapping manner, are not available from the sites representing the mature Harappa culture; even the Cemetery 'H' complex at Harappa was separated from the Harappan levels by more than a metre and a half of deposit of debris (Wheeler: 1947:84).

In his usual dramatic manner, Wheeler (1969:131) wrote,

> In the *Rigveda*, the invasion constantly assumes the form also of an onslaught upon the walled cities of the aborigines. For these cities, the term used is *pur*, meaning a 'rampart' 'fort', 'stronghold': one is called 'broad' *(prithvi)* and 'wide' *(urivi)*. Sometimes strongholds are referred to metaphorically as 'of metal' *(avasi)*. 'autumnal'*(śaradi)* — forts are also named: 'this may refer to the forts in that season being occupied against Aryan attacks or against inundations caused by overflowing rivers'. Forts 'with a hundred walls, *(*śatabhuji) are mentioned. The citadel may be of stone *(asmamayi)*: alternatively, the use of mud-brick is perhaps alluded to by the epithet *ama* ('raw', 'unbaked'). Indra, the Aryan war-god, is *purandara*, 'fort destroyer'. He shatters ninety forts for his Aryan protege, Divodasa. The same forts are doubtless referred to when in other hymns he demolishes variously ninety-nine and a hundred 'ancient castles' of the aboriginal leader Sambara. In brief, he 'rends forts as age consumes a garment'.

While giving overdue emphasis to the above-mentioned statements, right from the time he undertook the excavations of the fortifications at Harappa, till late in his life, Wheeler never tried to present scholars with factual evidence of their wanton destruction. In other words, Wheeler has never proclaimed anywhere, either in his excavation reports on Harappa or in general and specific publications, that the defences at the Indus sites were, in fact, pulled down and we have their debris in a particular layer. In these circumstances, there seems no justifications in the further quote from the *Rigveda* that, 'the same forts are doubtless referred to wherein other hymns he demolishes variously, ninety-nine and a hundred "ancient castles" of the aboriginal leader Sambara'. Obviously, here imagination has ridden over fact. We really wonder whether it is for this kind of historical license that throughout his life he fought the scientists who came to turn archaeology into a science.

Significantly, the literary evidence from the *Rigveda* as quoted by Wheeler in support of his theory still has one more dimension. In this context M.C. Joshi (1978:99) has made a very pertinent remark:

> There is no relevance of *ayasipuras* (forts of metal or iron) or *śatbhuji-puras* or forts with hundred walls in the Harappan context. None of the Harappan fortifications known to us bear any trace of metallic appearance or multiple walls to justify the appelations *ayasi* and *śatabhuji*. Even if the latter is supposed to refer to a defence-wall with hundred angles we cannot apply the term in question to any of the fortified Harappan settlements.

To Wheeler (1968:132) The Aryan invasion was an obsession:

> The discovery of fortified citadels at Harappa and Mohenjo-daro, supplemented by the defences of the Harappan sites of Sutkagendor in Makran, Ali Murad in Sind, Kalibangan in Rajasthan, and others have changed the picture. Here we have a highly evolved civilization of essentially non-Aryan type, now known to have employed massive fortification, and known also to have dominated the river system of north-western India at a time not distant from the likely period of the earlier Aryan invasion of that region.

The picture of defences of fortifications has, on every occcasion, been presented by exhibiting a section cut across the platform-like, mud-brick structure at Harappa. The author can clearly recollect his discussion with A. Ghosh, during the course of one of his visits to Lothal. The excavations were in progress and a few platforms made of mud-bricks were exposed. The platform could have easily been explained as a fortification or a defence wall but Ghosh was convinced by our explanation that they were only safeguards from the regular floods in the area. In the initial stages of occupation when the inhabitants of Lothal were confronted with the scourge of flood, they raised an embankment with the help of hard black cotton soil. When this course did not prove successful they decided to erect mud-brick platforms for occupation. The question now was: if a section across this mud-brick platform were cut, would a similar section-picture be not revealed as that, exhibited by Wheeler at Harappa to establish the existence of the defences. Ghosh did not lose any time in supporting our views. A close observation of Wheeler's section of fortification at Harappa would clearly show that he *did*

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

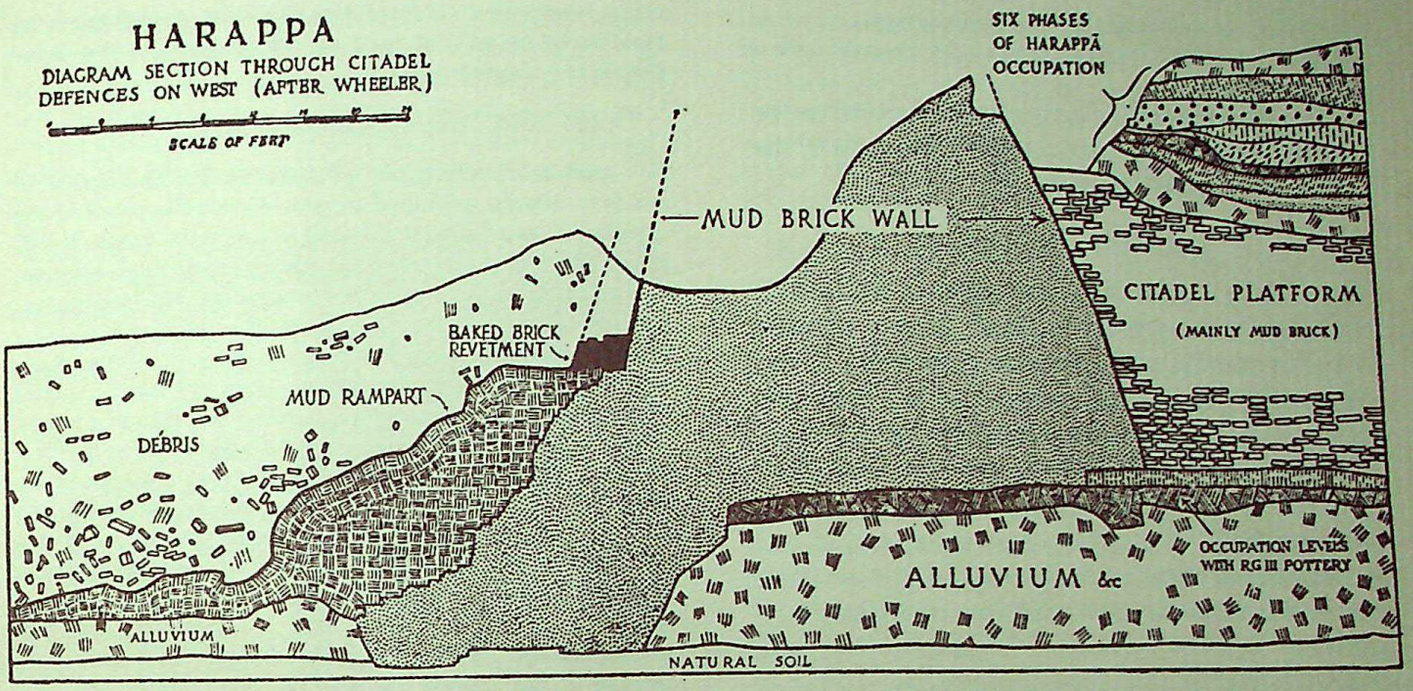


Fig.45.1. Harappa: A section across the citadel

not cut through the entire thickness of the 'platform', only a part of it was dug . Thus none knows how exactly this structure behaved inside. To our mind, it could as well be a platform of a kind we see at Kalibangan at least six of them, with fire altars. **(fig. 45.1)**.

The picture of the so-called defences at Harappa, Mohenjo-daro and Kalibangan as presented by Wheeler and others is not very different from that at Lothal. The so-called defences have enclosed certain areas in the same fashion as at Lothal. As a matter of fact they were never erected as a defence aganist attack or invasion but, simply as a measure against flood and also social status.

In one of his essays on society and settlement patterns, Bruce Trigger (1978: 1973) has rightly pointed out:

> In that societies where authority or class divisions are more pronounced, the houses of the elite become larger and more elaborate. In such places as the Marquesas, for example, the elaborateness of the platform on which a house was built reflected the importance of its owner.

So far as the class divisions at the sites of Lothal, Kalibangan, Harappa, Mohenjo-daro, etc. are concerned there is no ambiguity. Society was divided into definite classes on the basis of occupation and profession. Each one of them, it is believed, had a separate area of occupation in the city complex. The elite class which held authority over the settlements had its houses and or religious establishments on the highest point, created artificially by raising the working level with the help of high platforms. Thus, it was the class division , functional division and the distinction of the elite group from the rest which brought into existence the settlements of a so-called citadel; area completely segregated from the main city complex. In this context, another observation of Bruce Trigger (1978: 191) is also pertinent:

> A fort may become the residence of a chief and his retainers; as immovable property accumulates, the well-to-do may move into the fort, so that a town begins to develop; and artisans may settle in the town in order to sell their wares to the townsfolk and farmers who come to trade and to worship at local shrines. In other cultures, a cult centre also may serve as a fort or market place and in this way become the nucleus of city.

The growth of Harappan metropolises may have been of the same kind.

Bruce Trigger (1978: 193) further commented,

> The presence or absence of fortifications cannot be considered as direct evidence of the prevalence of warfare, since the effectiveness of such means of defence depends in part on either offensive or defensive warfare is in the ascendant.

Dales (1964: 38) is, therefore, right in raising some of the following most pertinent questions:

> Where are the burned fortresses, the arrow heads, weapons, pieces of armour, the smashed chariots and bodies of the invaders and defenders? Despite the extensive excavations at the largest Harappan sites, there is not a single bit of evi-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

dence that can be brought forth as unconditional proof of an armed conquest and the destruction on the supposed scale of the Aryan invasion.

The explanation of any citadel or fortification must, therefore, be worked out in the light of the above mentioned observations.

The Myth of Massacre

This brings us to the 'massacre' of people at Mohenjo-daro, since, as said at the outset, Wheeler combined the supposed evidence of the destruction of fortifications with the skeletons found in a helter-skelter condition at this site. Wheeler (1968:129) himself was not sure if the evidence was sound since he clearly states, 'unfortunately, the older excavations did not record stratification with any regard to precision, and in the absence of precise record it cannot be affirmed without shadow of doubt that the skeletal remains were not contemporary.' That all the skeletal remains were not contemporary to each other as the product of a single tragedy had been conclusively proved by Dales (1964), at least four years before Wheeler reluctantly accepted the position. Moreover, it is now well known that the excavator of Mohenjo-daro and the 'massacre' remains Marshall (1931), had himself separated the end of the Harappa Culture from the Aryan invasion by two centuries. He, in fact, attributed the massacre to bandits from the hills west of the Indus, who carried out sporadic raids on an already tired, decaying and defenceless civilization.

Below we quote in full Dales (1964) who made a thorough study of the so-called wanton killing of the masses at Mohenjo-daro since that would show in clear terms the obsession Wheeler had with his 'massacred men, women and children' who were long dead.

> What of these skeletal remains that have taken on such undeserved importance? Nine years of extensive excavations at Mohenjo-daro (1922-31) — a city about three miles in circuit—yielded the total of some 37 skeletons, or parts thereof, that can be attributed with some certainty to the period of the Indus civilization. Some of these were found in contorted positions and groupings that suggest anything but orderly burials. Many are either disarticulated or incomplete. They were all found in the area of the Lower Town—probably the residential district. *Not a single body was found within the area of the fortified citadel where one could reasonably expect the final defence of this thriving capital city to have been made.*
>
> It would be foolish to assert that the scattered skeletal remains represent an orderly state of affairs, since **there is no conclusive proof that they all even belong to the same period of a single tragedy.**

Dales (*ibid.*) then presents details:

> The most celebrated group of skeletons, the photograph of which is usually published to provided visible proof of the 'massacre', was found in the area of Room 74, House V (HR area). The interpretation of this grisly discovery was not even agreed upon by the excavators themselves. Mr. Hargreaves, who did the actual excavating, states that because four of the fourteen skeletons were found above the ruins of the southern wall of the room, the entire group belongs to a date subsequent to the decay of the building and thus to a period posterior to the abandonment of the latest stage of the city. Marshall, the over-all director of the excavations, says on the other hand 'this does not seem to be proven'. He points out that the building belongs to the intermediate period of the city and that this entire area was covered over and rebuilt in the Late period (the assumed Late period remains were not preserved at this part of the city; it is probable they had eroded away). Marshall suggests that the skeletons could belong to the interval between the Intermediate and Late periods, 'though the possibility of their being posterior to the Late period may be admitted'. He also disagrees with Hargreaves over the circumstances that produced this gruesome spectacle. Hargreaves stated with questionable perspicacity that the fourteen bodies 'appear to indicate some tragedy'. Furthermore, he observed that the twisted, intermingled positions of the bodies are those 'likely to be assumed in the agony of death than those of a number of corpses thrown into a room'. Marshall read the evidence differently. He believed that the bodies were intentionally interred 'within a few hours of death' or else they would have been prey for animals and birds. 'There is no reason whatever for doubting that these burials date from the declining years of Mohenjo-daro's prosperity', stated Marshall, but he didn't suggest they represent any final massacre of the population.
>
> During the removal of the thick accumulation of debris covering a courtyard of the Intermediate period (House III, HR area), incomplete remains of three skeletons were found. Their location in the debris shows, however, that they did not belong to the time of the courtyard but to sometime after it had fallen into disuse and hand been filled in, possibly in preparation for the buildings of the Late period. The excavator suggests that it represents a late funerary deposit and does not intimate any connection with the final 'massacre' of the city's population. Those who have so stated have misread the archaeological evidence.

One reads about 'the slaughtered Harappans' who 'lay unburied amid their streets'. This melodramatic description was prompted, in part, by the report find of six skeletons in a lane between two houses in the VS area of Mohenjo-daro. And yet, the excavator stated in his report that 'from their position they appear to be posterior to the adjacent remains'. They were covered with loose earth, free from bricks and other debris that would indicate any violent destruction. There is no suggestion in the report that they were lying on the actual street surface. Marshall suggests again that they

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

were probably burials of the Late period that just accidentally penetrated down between the building walls bordering the lane—the lane itself having been long before covered over. Had the skeletons really been found directly on the street surface, there would still be no case for a final 'massacre' because the lane belongs to the Intermediate period of the city.

Deadman's Lane in the HR area of the city was the scene of another well publicized but mythical street slaughter. One fragmentary skeleton (part of a skull, the bones of the thorax, and the upper arm of an adult) was found lying on its back diagonally across the narrow lane. But this incomplete skeleton was not resting directly on the walking surface of the lane. It appears to have been in the debris that accumulated between the walls of the building facing the lane sometime after the lane had fallen into disuse. The lane itself belongs to the Intermediate period of the city. This area was rebuilt during the Late period and houses covered the location of the earlier lane. The excavator suggests that this partial skeleton was interred under the floor of a house of the Late period. Thus, it was just accidentally located in the proximity of the lane and was not associated with it at all.

Another celebrated group of 'victims' consists of nine skeletons that 'lay in strangely contorted attitudes and crowded together' (Block 10A, DK area). Ernest Mackay, the excavator, expressed considerable doubt about the date of these remains. They were reportedly found at a level corresponding to the early part of the Intermediate period. For 'convenience sake', Mackay termed the find-spot a burial pit although he admitted that he noticed no definite walls for the 'pit' nor any traces showing that the area had been dug. Only two objects were found with the skeletons—an ivory comb that is not like the known Harappan period combs, and a copper bracelet. On the evidence of the bracelet, Mackay dates the remains to 'the period of the occupation of the city'. The technical report on the skeletal remains states that they probably do not represent a massacre *per se* because many of the skeletons were incomplete, represented by only a few fragments of cranium and odd bits of bone.

Dales (*ibid.*) further discusses the theory of Mackay in this context:

> Mackay suggests that these were the remains of a family who tried to escape from the city with their belongings at the time of a raid but were stopped and slaughtered by the raiders. Their bodies were then 'thrown pell-mell into hurriedly made pit'. He says it is 'quite possible' that the tragedy took place in the final period of the city but can offer no supporting evidence. That at least five of the nine skeletons were of children prompted the anthropologist who studied the remains to conclude that 'the raiders nursed a consistent hatred of the people of Mohenjo-daro as a whole, and total extermination appears to have been their endeavour'.

Possehl (1979: 287-8) also rightly points out that, in case the Aryan hypothesis is accepted, 'many problems emerge':

> First, the chronology of the Indus Civilization, at least the Urban Phase during which the cities were fully occupied, cannot be projected to have a terminal date beyond 1800 B.C. It is widely agreed that the Vedic literature from which the hypothesis is drawn was compiled sometimes between 1200 and 800 B.C. This leaves us with a chronological gap of between 600 and 1000 years, and it hardly seems reasonable to postulate that this discrepancy can be filled by the period between the historical destruction of the cities and the compilation of the Vedas.

Moreover, the end of the Harappan cities, it is now widely recognized, was not the end of the Harappa culture. It was in fact succeeded by what is now called the Late Harappa culture, particularly in Gujarat, Haryana, Rajasthan and Uttar Pradesh. In other words, observes Possehl (1979:287)

> If the cities were abandoned then it must have been caused by something characteristically urban. This brings to mind institutions such as kingship and the differentiated nature of city-based political institutions; economic factors such as craft and productive specialization, including the relationships necessary to unite them with a large organic whole,systems of trade and tribute which are necesary for urban elites and their particular style of life; and the differentiated social structure which has been presumed to characterize urbanization.

Indra, therefore, stands completely exonerated.

The End of Harappa Culture

This leads us to the last question associated with the entire problem of mythical invasion: if not the invasion what then was the cause of the end of the Harappan towns of Harappa and Moehnjo-daro in particular and other towns in the Punjab, Haryana and Rajasthan in general where the early Aryans seem to have had their abode? As a corollary, we will also examine the roots of the Wheelerian version of the invasion theory, which, to us appears to lie in the directional changes through which Wheeler's archaeological career passed.

The end of Harappa culture may not have had a single cause. The decline in foreign trade was certainly quite important. The literary sources from Mesopotamia yield yet another kind of evidence which contributed to the decline of urban economy of the Harappans—the Mesopotamian trade with the Indus sharply declined at the end of the Third Dynasty of Ur in 18th century B.C. since from then onwards, the items which were imported from India were procured from southern Arabia, Ethiopia and Egypt (Asthana 1979: 43; Wenier in this volume-ed).

For the decline of Mohenjo-daro, however, natural causes are listed. The one now generally

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

agreed upon is the 'Floods in the Indus', a fairly detailed study of which was made by Raikes (1965: 202). (See its details by Raikes in this volume. ed.)

However, what applies to Mohenjo-daro may not apply to other Harappan settlements—there is no archaeological proof that Harappa was destroyed because of floods in the Ravi or Kalibangan was destroyed by the floods in the Ghaggar. For their end, the old theory of climatic changes and desiccation of land from about 1800 B.C. has been revived on the basis of fresh studies made by Gurdip Singh (1971). (See its critique by V.N. Misra in this volume. ed.)

There have been a few other studies (Fairservis 1967), some concerning the social break-up of the Harappans, some concerning demographic changes, and some concerning the general principles governing the rise and fall of city civilizations. However it should be clearly understood that the end of the Harappan towns and Indus Valley Civilization was a very complex affair in which many socio-economic and environmental factors contributed and certainly not the mythical invasion by the Aryans and the mythical massacre of the Harappans. The end of the Indus Valley Civilization was a slow process and not catastrophic.

Why Did Wheeler Blow up The Invasion Theory?

In retrospect, when we look at Wheeler's career as an archaeologist in England and India and we see him as a Brigadier in the British army during World War II, we feel he could not interpret the dubious evidence of Mohenjo-daro and Harappa in any other manner. He started his real archaeological career from Maiden Castle excavations and soon emerged as an authority on Roman archaeology. His *Rome Beyond the Imperial Frontiers* clearly shows how deeply involved he was in the Roman art and architecture, Roman concepts of town-planning — citadels, lower towns, assembly-halls, etc. Thus when he was confronted with the twin-mound towns of the Harappans and their huge fortification walls and mud-brick platforms as well as the photographs of the so-called 'massacre' at Mohenjo-daro he was at once reminded of Roman history and archaeology. Marshall's (1931) and Vats' (1940) reports on Mohenjo-daro and Harappa, respectively, as well as Piggott's *Prehistoric India* (1950: 244-248) provided him sufficient speculations on Aryan warfare and Indra's attack on Harappan towns. The common text-books on Indian history adorned his personal library. For the former army man and the Director General of Archaeology in India, as Wheeler was, the Aryan invasion of Indus towns (1961:249) was as simple as the Roman invasion of Britain andTurkey. Wheeler's successors in England, it is significant to note, were no better apreciators of archaeological evidence; Allchin and Allchin (1968: 144-56) reiterated the same. Wheeler's interpretations were somewhat lop-sided if not biased but his techniques of excavations have been the model for all subsequent generations of archaeologists in India. B.B. Lal (1980), one of his foremost disciples in India, has now conclusively proved that the 'citadel' of Kalibangan, another Harappa, was the seat of religious establishments. A beginning in the right direction has been made.

NOTES

1. In fact it was V.S. Agarawal who provided these references to Dr. Wheeler when the latter requested Prof. Agrawal, then an officer in the Archaeological Survey of India, on tour at Harappa, although Dr. Wheeler never acknowledged it in any of his writings.

REFERENCES

Agrawal, *et al.* 1964. Radiocarbon Dates of Archaeological Samples. *Current Science.* Vol. 39 (B).

Allchin, B. and Allchin, F.R. 1968. *The Birth of Indian Civilization.* London: Pelican.

Asthana, Shashi 1977. Indus-Mesopotamian Trade: Nature of Trade and Structural Analysis of Operative System. In *Essays in Indian Protohistory;* D.P. Agrawal and Dilip K. Chakrabarti ed. 31-43.

Dales, G.F. 1964. The Mythical Massacre at Mohenjo-daro, *Expedition.* Vol. VI, 3; 36-43.

Fairservis, W.A. 1967. The Origin, Character and Decline of an Early Civilization. *Novitates;* No. 2302. New York: American Museum of Natural History.

Joshi, M.C. 1978. Archaeology and Ancient Tradition—Some Observations. *Puratattva.* No. 8.

Lal, B.B. 1980. Some Reflections on the Structural Remains at Kalibangan. Cyclostyled paper circulated

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

by the Indian Institute of Advanced Studies, Simla.

Marshall, John 1931. *Mohenjo-daro and the Indus Civilization*. London.

Raikes, R.L. 1965. The Mohenjo-daro Floods. *Antiquity*. Vol. XXXIX; 165-203.

Singh, Gurdip. 1971. The Indus Valley Culture Seen in the Context of Post-Glacial Climate and Ecological Studies in North-west India. Reprinted in *Puratattva*. No. 6; 68-76.

Trigger, Bruce. Time and Traditions. In *Essays in Archaeological Interpretations*. Edinburgh.

Vats, M.S. 1940. *Excavations at Harappa*. New Delhi.

Wheeler, R.E.M. 1961. Ancient India: The Civilization of a Subcontinent. In *The Dawn of Civilization*. Stuart Piggott ed. London.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

46

Bridget Allchin

The Harappan Environment

It seems to be agreed, among most recent writers that the development and continuation of an urban culture, centred upon the Indus plains and extending into other regions generally associated with the Indus system during the third millennium B.C., must have depended upon a fine balance of political, social, economic and environmental factors being successfully achieved and maintained. Some progress has been made in understanding the social and economic aspects of the urban sites from evidence provided by their excavation, and in extending this approach to the culture as a whole (F.R. Allchin 1979, in press). The political aspects of the culture, both internal and external, are still obscure, and are likely to remain so until more direct evidence can be obtained from archaeology or from reading the script. The environmental and wider ecological aspects of the entire culture have received relatively little attention from archaeologists, although there is a considerable body of evidence from various sources on this subject (see for example papers in Possehl and Kennedy 1973). Environment is a basic part of any culture, and some understanding of it is essential in order to comprehened the ecological balances upon which its economy is built. Environment also plays an important part in forming the character of a culture. In many ways the role of the environment is negative rather than positive, for it will always set certain ultimate limits upon the achievements of a community by making developments in certain directions either impossible or uneconomic. On the other hand, a community can only realize the full potential of its environment as and when other factors, such as size of population, level of technology and social development allow.

It also seems to be fairly generally agreed that the Harappan or Indus culture grew up in a particular kind of environment provided by a great river flowing through a desert, and therefore has only a limited number of parallels in the world. The two most often cited are ancient Egypt and ancient Mesopotamia, from the latter of which the Harappan culture has often been assumed to be derived. Recently this assumption has been challenged on the basis of discoveries, mainly in the western borderlands, that provide positive evidence of its independent genesis (Jarrige 1981 in press; F.R. Allchin 1980). The ancient culture of the Oxus has been cited as another possible parallel, and a source of trade links and mutual cultural and economic stimuli (Gupta 1979; Chakrabarti 1977). Even superficial consideration shows that the Indus system and its surroundings differ in a number of ways from the environmental setting of any of the others mentioned, and is, in certain respects, unique. Therefore, it is important that the analysis of the Harappan environment should be approached with as few pre-conceived ideas as possible before attempting to assess its role in the development, continuance and eventual decline and disintegration of the Early and Mature Harappan or Indus culture.

The region under consideration consists of the Indus plains of Sind and Punjab; various ancilliary or adjacent regions, such as the Kachhi plain

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and Las Bela district to the north-west of the Indus; the Indo-Gangetic divide, the course of the Sarasvati river, the upper course of the Yamuna where it enters the plains to the east; Saurashtra and the plain of Gujarat to the south. The character of surrounding regions, i.e., the Himalaya and Karakoram ranges in which the Indus and all its major tributaries rise, the Thar Desert on the south-east, and the arid mountain ranges to the north-west of the Indus must be taken into account.

No environment is static, least of all that of the Indus system. All environments are continually changing as the result of the interplay of natural forces, today and during historic and later prehistoric times, nearly always further modified by the activities of man. How far human activity affected the environment in earlier prehistoric times, before the advent of widespread domestication of animals and crop cultivation is a matter for careful investigation in any given situation. In general there is more and more evidence that hunter-gatherers and early pastoral communities had a considerable effect upon their environments, both unintentionally and intentionally, as for example by burning grassland and forest.

In the case of the Indus system, the factors causing environmental change may be seen as falling under three main headings:

1. *Tectonic Activity:* This plays a particularly active role here because of the proximity of the junction of two major plates of the earth's crust, peninsular India and the mainland mass of Asia. The former is actively thrusting itself against the latter, causing the folding and uplifting of the mountains of Baluchistan and the north-western borderlands; of the Sivalik, Himalaya, Karakoram and other ranges, and the Tibetan plateau. In doing so, it causes earthquakes, landslides, changes in the course of major rivers, and other, sometimes catastrophic, events. It also tends to accelerate the processes of erosion and agradation basic to soil formation and affecting many other aspects of the natural resources of the region.

2. *Climatic Change:* Whether world-wise or more restricted in character this is a very important factor in an arid region such as this where a slight change in average rainfall, temperature or humidity, or a slight shift of rainfall distribution throughout the year can be crucial in rendering large areas of land habitable or uninhabitable for animals or men; capable or incapable of supporting agriculture. (Allchin, Goudie and Hegde 1978).

3. *Human Activity:* Whereas a natural environment may be summarized as an outcome of the interaction of climate and other earth processes, we have in this region, during the period we are considering, a third important factor constantly at work: human communities of several different kinds, some quite large and highly organized. The systems these communities adopted for exploiting their environment seem to have had both short and long term effects upon it, and any study of the Harappan environment must take this into account.

To consider all the manifestations of the interplay of these three main factors, let alone subsidiary and secondary factors that arise along the way, would require a great deal of primary research in the field, and detailed investigation of existing data from a wide variety of sources and disciplines. The purpose of this paper is not to treat the subject in this exhaustive manner, but to indicate some of the characteristics of the Indus system and its surroundings, and manifestations of environmental change significant for early urban development, as seen from the point of view of an archaeologist seeking to understand the wider ecology of the Harappan world.

Tectonic Activity

The uplift of the Himalayas affected the piedmont region and the plains in a whole variety of ways, some fundamental to the economy and life-style of the human population. There are two principal categories of change of this kind registered in the topography of the region today that must have fundamentally affected its agriculture and urban development during Harappan times, and influenced the extent to which archaeological evidence of this period has survived. These are (1) changes in the courses and volume of the major rivers, and (2) changes brought about by the accumulation of silt carried down during periods of spate from upstream and deposited in the course of regular inundation of the plains, and more widely by exceptional floods.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Changing River Courses

A number of studies of changes in the courses of the major rivers of the Punjab have been made. The earliest are those of the Oldham brothers who brought together observations made in the course of their extensive travels and material from literary and historical sources (Oldham, R.D. 1886; Oldham, C.F. 1893). The German geomorphologist Wilhelmy more recently made a study of this kind, extending further back in time on the basis of geomorphological and geological evidence (Wilhelmy 1969). He also wrote a paper on the lower course of the Indus and its delta (Wilhelmy 1968). All these accounts indicate that one of the major changes to have taken place is the virtual disappearance of the Sarasvati, one of the major tributaries of the Indus, since the end of the Mature Indus period. This seems to have taken place by a process of periodic shrinkage of the volume of water carried, so that the river gradually became unable to maintain a constant flow through the desert and reached neither the sea, via the Hakra, nor the Indus. This appears to have resulted directly from the loss of some of its tributaries, probably through their being captured by other major rivers within its main catchment area in the Himalayas. It has been suggested that the Sarasvati in its entirety was ultimately captured by the Yamuna. Aurel Stein travelled along the dry course of the river and noted the presence of settlements, since shown to be of the Early and Mature Indus periods, and the declining number of settlements of succeeding periods (Stein 1942).

Kalibangan, excavated by the Archaeological Survey of India (1960 to 1969), but so far unfortunately not published, is a major settlement of the Early and Mature Indus periods noted by Stein. A series of further geological and geomorphological contributions have been added to the history of the Sarasvati valley, and indicate that the river probably finally ceased to flow during the first millennium B.C. (see for example Rydh 1959; Surajbhan 1972).

Related to the history of the Sarasvati is that of another abandoned river channel, the Hakra, in Sind. evidently the former course of a major river which once flowed along the eastern margin of the alluvial plain, dividing it for some distance from the dunes of the Thar Desert. It has been argued that the Hakra once carried the combined waters of the Sarasvati and the Sutlej debouching into the Rann of Kutch to the east of the Indus delta. It has also been argued that the Hakra once carried the entire waters of the Indus, including the Sarasvati and the Sutlej. Probably both have been true at different times. Today the Hakra carries the excess flood-waters of the the Indus. Flying over the Indus plains one is aware that in Sind almost the entire area between the Indus and the Hakra is covered with traces of former channels, some as wide as that of the present Indus channel. Similar indications of alterations in the channels of the major Indus tributaries in the Punjab can be observed. The whole question of the effect of the unstable nature of the lower course of the Indus and its tributaries upon early settlement and agriculture in Sind has been dealt with at some length by Lambrick, on the basis of the wide personal experience of the region in the recent past and an intimate knowledge of its history (Lambrick 1964). More recently, it has been argued that the westward progress of the main channel of the lower Indus, and of some of its major tributaries is due principally, and perhaps solely, to the direct effect of the impact of the Indian plate (peninsular India) upon the Afghan plate (Snelgrove 1979). It seems more likely that while this was the primary cause, other causes were also at work.

Few if any, Early Indus settlements have been recorded out in the alluvial plain of the lower Indus: the majority appear to be founded on rock or on fan deposits of gravel and other hard materials. Whether this was because of an awareness of the danger of being swept away by the river, or because any settlements there may once have been were either swept away or submerged by the subsequent accumulation of silt is not at present clear. There can be little doubt, however, that both these factors must have contributed to the loss of archaeological evidence of early settlement in the plains. We shall return to the questions of the rate and the effect of the building up of the plain, but first one question regarding the unstable nature of the river and its consequences, which Lambrick has dealt with at some detail, must be briefly mentioned. This is the impact that even a relatively minor change in the course of the river or the volume of water it carried could have had on the economy of a settlement of the Indus period. The Indus plains today are so ex-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

tensive that even in years of above average flooding, the entire plain is not inundated, but only certain areas. Today alterations in the channel and excessive flooding are largely controlled by dams, barrages and an extensive system of irrigation canals, but this was not the case in Harappan times. Then settlements were exposed to the full effects of changes far upstream as well as locally. A large area could also be deprived of its inundation water; by the reduction in the amount of water available due to the loss of a major tributary, in the case of the Sarasvati, or the diversion of part of the normal flow to an alternative channel such as the Hakra. Conversely, the capture of a new tributary such as the Sutlej or the blocking off of the Hakra as an outlet for excess flood water could have an equally devastating effect by increasing the floods lower downstream. All these events and a number of others have been suggested as hypothetical causes of the abandonment of Mohenjo-daro. At present, none can be proved to have coincided with the end of the city, but each is an example of the kind of change that appears to have been taking place during historic and prehistoric times, and must be regarded as part of the totality of the Harappan environment.

The Building up of the Plain

The next major environmental factor that needs to be taken into consideration from the point of view of the development of the Harappan culture is the process of building up the plain by the process of agradation, or deposition, of alluvial material by the main river and more locally derived, colluvial material. This has been discussed elsewhere (Allchin 1976), and it is not proposed to go into it in detail here. The important point is that this process appears to have been going on at a significant rate, estimated at approximately two metres per millennium in the vicinity of Mohenjo-daro. Obviously, this pattern was not uniform throughout the plain, and the earthdust must have been very much greater in some areas than in others, but it gives some idea of the scale of deposition, which in many areas would be sufficient to completely submerge a small settlement in the course of 3,000 to 4,000 years and in some places very much less, so that all record of it would be completely lost. It would only be discovered in the event of a subsequent change in the course of the main river or a tributary. A case in point is the ceramic and pre-ceramic settlement at Mehrgarh, near Sibi in the Kachhi plain, revealed by a lateral movement of the main channel of the Bolan river where it debouches into the plain (Jarrige and Lechevallier 1977).

The steady deposition of alluvium must have covered many features of the landscape of the Indus valley besides abandoned settlements, and caused it to become increasingly flat and featureless. The steady filling up with alluvial deposits of the trough between the mountain ranges on the north-west and the low plateau and hills of the Thar on the south-east, in which the lower Indus flows, must also have resulted in a lateral expansion of the plain. These and other factors must have tended to make the river more mobile and generally unstable. With a wider plain for the flood water to spread over, the chance of a settlement losing its inundated land due to the various causes already mentioned must have steadily increased.

Earth Quakes

Tectonic movements on the scale implied by what has been said earlier on the subject of changing river courses must have been associated with earthquakes, some on a scale to have serious consequences for settlements in the plains. At certain sites, as for example at Kalibangan, indications of earthquakes during the period of occupation have been recorded by the excavators. A study of the date and severity of instances of earthquake damage at Early and Mature Indus sites would be of great interest. The whole region is in the earthquake zone today, and has been subject to severe earthquakes in historic times, as witness the Quetta earthquake of 1937. Another example is the earthquake that lead to the inundation of the Rann of Kutch, and drowning of the small town of Sindri, and the appearance of the 'Allah bund' in the eastern part of the Indus delta in 1819. Aided by a certain amount of human malice on the part of the rulers of Sind and the region immediately to the north of the Rann who wished to deprive the inhabitants of Kutch of irrigation water, this event contributed to the final extinction of the easternmost distributary of the Indus delta (Burns 1835). There can be little doubt that such events must have been part of the environmental background of the Harappan world, but whether they tended to be more or less frequent and severe than in

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

recent times is, on present evidence, only a matter for speculation. It is, however, a matter that should be investigated especially in relation to the decline and abandonment of the major Harappan cities.

Recently it has been shown the events such as this in the region of the Indus delta, while undoubtedly related to major tectonic events and processes, as already indicated, are more locally and directly due to relative changes in level of grabens or blocks of the earth's crust along certain fault-lines. This is perhaps induced in part by the weight of accumulated silt causing some blocks to subside (Glennie and Evans 1976). The result in such a situation is that more silt accumulates in the area of subsidence, until, as in the case of the Rann of Kutch, the sea ceases to cover the area except at certain seasons of the year, on the occasion of particularly high tides, etc., and in due course the block may sink again and the whole cycle will be repeated (Gupta 1972). Events like this may have had a fundamental effect on the Harappan environment, especially on the extent to which the sea penetrated the present delta region, and even the lower Indus plains at times, and conversely areas of the delta now submerged were exposed and available for settlement, or for seasonal use by pastoralists, fishermen, etc.

Climatic Change

There is evidence from various sources that minor fluctuations of climate have taken place in the region during the Holocene. These appear to have taken the form of slight alterations in the amount and distribution of rainfall throughout the year. One such period of somewhat more humid conditions is thought to have coincided with, and probably contributed to the achievement of the Mature Indus phase. The onset or return of more arid conditions appears to have contributed to its decline (see for example Fairservis 1967; Gurdip Singh 1971). Even a slight amelioration of arid conditions such as we see today would have increased the availability of surface water, game and pasture for domestic animals, and probably made possible dry (i.e., non-irrigated) cultivation of cereal crops, other food plants and cotton on parts of the plain not subject to inundation. It would also render large areas along the margins of the Thar and in the mountain valleys to the west suitable for grazing sheep, goats and cattle; areas that are virtually unusable today except briefly following exceptional rains. This in turn would allow the fertile alluvial soil of the plains to be reserved for cultivation wherever necessary. It would also encourage the growth of more and larger trees where only small trees and bushes thrive today. The supply of readily accessible timber and firewood would be increased; and so would the supply of game, all kinds of edible wild fruit and plants, and probably honey. If we are right in assuming that the wild animals depicted on the Indus seals, which include elephant, tiger and rhinoceros, were all indigenous to the region, their presence supports the kind of improvement in the environment we have indicated. The gallery forest along the banks of the Indus would have probably been much like the undisturbed stretches we see today, and with less human interference would have provided a suitable environment for buffalo (also shown on the seals) and other animals and birds.

A marginally higher rainfall would increase the forest cover on the hills and in the interior valleys to the north-west of the Indus plains. Under climatic conditions such as we see today but without the excessive timber cutting, firewood collecting, grazing animals, etc., many areas would carry considerably more forest and woodland than they do. This is demonstrated by areas that have escaped over-exploitation, either by accident or design; by the quantities of timber still being exported from remote areas of the North-west Frontier Province; and by descriptions of the Punjab and the North-west Frontier given by travellers throughout the nineteenth century. Alexander Burns describes a tiger hunt, in the jungle only a few hours ride from Lahore in 1832 (Burns 1834). Later in the century there are descriptions of dense woodland on either side of the road going north from Peshawar to the Khyber Pass, in which malefactors hid. Today Lahore is surrounded by agricultural land; the area on through which the road going north from Peshawar passes is devoid of anything larger than an occasional small bush, with nowhere for anyone to hide. In Swat and Dir, on the other hand, where the rainfall is a little higher, and the pressure on the land a little less, sizeable trees can still be seen on the hillsides. An overall increase in vegetation would be accompanied by an increase in soil cover and corresponding capacity for soil and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

water retention. This, in turn, would induce a more even flow throughout the year in the tributaries of the lower Indus, with less flash flooding. Rivers, such as the Bolan which now loses itself in the Kachhi plain and fails to reach the Indus, may then have been active instead of merely potential tributaries, and the dead drainage systems of the Thar, now blocked by dunes, may have functioned, at any rate during certain seasons of the year. More regular through-flow and better local drainage would tend to reduce the tendency to salinity in the region as a whole.

Human Activity

From what has already been said it must be clear that the effect of many present day activities upon the landscape is much the same in certain respects as a natural increase in aridity. There is also evidence that the same was true in the past, certainly in limited areas and perhaps more generally. The most obvious and immediate effect of any human settlement, large or small, upon its environment is signs of wear on the surrounding soil and vegetation. In the case of villages in the arid zone on the margin of the desert, in eastern and central Rajasthan this is particularly noticeable as a regular feature when flying over the area, and it is also apparent from the ground. In less arid areas, the place of the bare zones is taken by characteristic weeds. Generally the surroundings of mounds or settlements of the Harappan period abandoned in antiquity have recovered or lost all traces of this kind of wear but in some cases gullying or loss of top soil can still be observed. This particular feature has not been observed at Early or Mature Indus sites in the plains, on account of subsequent irrigation, intensive cultivation or the deposition of silt around them. It is something that should be looked for and taken into account in future research programmes.

Any settlement or regularly inhabited place also has some wider influence upon its environment. Grazing herds of domestic animals, often not indigenous to an area, can modify the natural vegetation considerably; so can regular selective killing or driving out of certain wild species because they are desirable for food, compete with domestic animals or prey upon them. The cutting of trees, bushes, etc., for timber, firewood, and fodder for animals has an even more direct impact. As part of a mixed agricultural, pastoral and hunting based economy, clearance for fields is likely to be of a limited and rather temporary nature. This is because as land becomes exhausted or otherwise unsuitable for cultivation, the tendency is to abandon it and clear new ground. The old cultivated areas are then allowed to revert to wild vegetation. Such secondary growth, however, is seldom if ever identical with what went before it. Nearly always it is further modified by grazing livestock eating the young trees before they can establish themselves; by the loss of residual islands of single or interdependent groups of species surviving from earlier climatic regimes; the rapid takeover of certain weeds and other factors. Often clearance of land is far more widespread than is strictly necessary for the cultivation being achieved by burning tracts of forest, woodland, bushes and long grass indiscriminately. Areas not immediately utilized for cultivation may then be left alone, and after a few months the fresh growth of grass and young plants will attract wild animals such as deer and other species desirable for food, or provide rich grazing for domestic animals. This process is known to have altered the plant population of whole regions in recent times. It can turn forest or woodland into open grassland, or denude it of vegetation altogether. There are a number of instances of both these situations in North America and Brazil. There is increasing evidence from many parts of the world of similar processes having taken place in the past, perhaps even in Palaeolithic times. Therefore, there can be little doubt that all these factors and many more have been at work modifying the flora of the Indus plains from the time of the earliest settlement and probably long before that.

Any modification of the flora of a region is bound to be reflected in its animal population, although local forest clearance may do little more in the first instance than drive the wild animals away from areas of settlement, and reduce their numbers somewhat. We know from historical records that until well into the last century, the Indus plains and adjacent regions, particularly to the south and east, were rich in wild life, including species highly prized for food such as Nilgai and other kinds of deer. Lion, tiger, leopard, rhinoceros, camel, onegar (wild ass) and wild pig have all been recorded in the region. The immediate environs of the Indus and its tributaries must have provided an ideal environment for buffalo, as already pointed out. The seals of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the Mature Indus period represent several of these species, and also elephant and at least two kinds of cattle. How close to the urban settlements any of these animals were found in a wild state we do not know. Nor do we know whether any type of cattle or elephant was indigenous to the region in Early Indus times or was present only as a domestic species.

The establishment of the earliest settlements must have set in motion processes of change or modification in the environment of the Indus region similar to those observable today. These may have been somewhat counter balanced by the amelioration of climate thought to have taken place at or near the beginning of the Mature Indus phase. The larger, more specialized agricultural and urban communities of the Mature Indus period must have stepped up these processes, increasing pressure upon their immediate environment in each case. As the various processes indicated, extended more wisely the plain as a whole must have changed in character. One of the most positive indications of this is the change in lithic tool assemblage that takes place with the emergence of the Mature Indus culture. The wide range of artefact types seen at Early Indus sites, varying somewhat from site to site but always appearing to provide a tool-kit suited to the many needs and activities of a self-supporting subsistence economy, gives way to a much more limited and more specialized kind of equipment.

The lithic tool-kit of the Mature Harappan city dweller consisted almost exclusively of long, straight, parallel sided blades which appear to have been professionally made and imported to the cities from sources of high quality material. In the case of Mohenjo-daro one of the main sources appears to have been in the Rohri hills, approximately eighty-three kilometres up the Indus (Allchin 1976). The blades appear to have been used for domestic and urban purposes generally, including probably trimming some of the finer ceramic on the potter's wheel. Possibly they were also used for harvesting cereal crops. There is no evidence that they were used for the wide range of functions served by the whole gamut of scrapers, 'geometric' microliths, burins, awls, etc., found in Early Indus and other early assemblages. This cannot be wholly attributed to the increasing use of copper as has sometimes been assumed, as it always appears to have been used to a rather limited extent, probably on account of its cost. The one major noteworthy exception to this is the bead workers' tools, large quantities of which were found at Chanhu-daro (Mackay 1937). The tools and methods involved go back to much earlier times, and continued in modified form long after the Mature Indus period, apparently as an unbroken tradition of working semi-precious stones that is still successfully practised in Gujarat, Central India and elswhere in the subcontinent (Allchin 1979a). The more varied functions served by the wider range of lithic tool types found in the earlier cultural phase must be assumed to have been in the hands of communities outside the major urban centres during the Mature Indus phase (Allchin 1979b).

As argued by Fairservis (1967) and others, even a slight deterioration of climate, such as that envisaged on the basis of palaeobotanical and other evidence to have taken place coincidentally with the decline of the Indus cities (Singh 1971), could have accelerated the processes outlined here, and brought about a very rapid deterioration in the environment such as we see taking place today in marginal regions under great pressure from human activity. Even at the end of the urban phase it is probable that, with the exception of the environs of the cities, both fauna and flora were better preserved in the Indus region as a whole than they are today. The scale and completeness of change today is probably unprecedented except at times of climatic change; the difference is that today it is a man-made change.

A further factor that operates today, and may possibly have had some effect in the later stages of the Mature Indus period too, is pressure on the catchment areas of the local tributary streams such as the Kabul, Kurram and Bolan rivers. Today this takes the form of over-grazing and over utilization generally, and particularly the commercial exploitation of timber in the mountain valleys. At present we have little evidence as to whether this took place in Harappan times, apart from one or two instances of a circumstantial kind. Perhaps the clearest example is the situation of Judeirjo-daro, a Mature Harappan settlement of considerable size, in the now barren Kachhi plain, many miles from any perennial source of water today. Decreasing water retention in the surrounding hills seems to have combined with irrigation along the margins of the plain to bring about this situation. The Bolan River which debouches into the plain to the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

north-west, peters out before reaching either Judeirjo-daro or the Indus. Whether this is an isolated case due to peculiar local conditions or demonstrates a more general change is not clear at present.

So far we have outlined some of the more obvious ways in which the environment of the Early and Mature Indus culture probably differed from that of the present day, attempted to assess the extent of these differences and the nature of the processes that brought them about. As yet, this is all too indefinite to allow any attempt at a detailed reconstruction of the environment, or of the ways in which change took place during this period of approximately one thousand years. We can however make certain general statements about the Harappan environment that probably have a good chance of being fairly near the truth. Some of these may appear almost self-evident, nevertheless they need to be said in this context in order to put the totallity of the environmental background of this remarkable culture into perspective.

Conclusion

The environment of the Early and Mature Indus culture was dominated by two factors: the Indus River system and the desert. It was and is the combination of these two contrasting elements that form the character of Sind and the lower Punjab, the hub of the Harappan world. Added to these is a third factor, heat, for these are regions of minimal or non-existent rainfall and high temperatures throughout the year. Indeed the rainfall is so low and the rate of evaporation so great that much of the region would be completely arid and quite unsuitable for animals or man were it not for the rivers. The Indus and its tributaries are the only source of water for all purposes, domestic, agricultural and industrial. In addition, the inhabitants of the Harappan cities must have depended upon the rivers for fish which appears to have formed a significant element of their diet, and to some extent for transport. The narrow corridors of gallery forest on each side of the river, and the somewhat wider belts of inundated land (today increased by irrigation) beyond make the united Indus, where it flows through Sind, appear like a long sinuous oasis. Higher up, the contrast between the immediate surroundings of the rivers of the lower Punjab and the intervening arid country is not quite so strong.

Especially at the beginning of the period, the alluvial plain of the lower Indus was probably slightly narrower and more constricted than it is today, with more exposed features such as outcrops of rock and fan deposits along its margins. More tributaries carrying the drainage of the mountainous regions to the north-west must have reached the main river than is the case today. Probably there was also more local drainage from the Thar region on the south-east, at any rate at times of slightly more favourable climate. Any streams draining into the Indus plains from this direction must have flowed into the Hakra, and thence, combined with the water of the Sarasvati and perhaps the Sutlej, into the sea via the Rann of Kutch. Thus, it is highly probable that, during part of the total period at any rate, there was a second major river on the opposite side of the plain, flowing more or less parallel to the main channel of the Indus which flowed approximately where it does today. As a result of these and other factors we have indicated, the alluvial plains built by these rivers were probably a little less extensive, but rather more stable than they have since become.

The alluvial plains were the focal region where the main urban sites of the Mature Indus period were located, and cereals, many other food plants and cotton produced. They also provided the materials from which the bricks, both burnt and unburnt, used in building the cities were made; the clay for making the characteristic Harappan pottery and many other objects. One basic material the plains did not provide was stone. This had to be imported at great cost, or substitutes found: usually these took the form of baked or unbaked clay (Allchin 1981, in press).

During Early Indus times when population pressure must have been low, and again during the Mature Indus phase when the climate is thought to have been rather more humid than it is today, there was probably rather more vegetation on the margins of the Thar and on the western margins of the plains than at present. Given this situation there would have been no lack of game, ample grazing for cattle, buffalo, sheep and goats—the domestic animals that appear to have played a prominent role in Harappan economy. Camels do not appear to have played a part in urban or agricultural life as such, although their

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

bones have been recorded at certain sites, but they may have had an important role in long distance trade and transport. Predatory animals must have been a very real danger to people and animals. All livestock must have had to be carefully guarded, especially at night, and travellers and traders no doubt went in groups or convoys (caravans) for safety. The Rohri hills of upper Sind, a low dissected limestone plateau interrupting the alluvial plains at this point, through which the Indus and Hakra channels pass, provided chert for making stone blades, but other essential or useful objects of stone had to come from surrounding regions where stone was plentiful. They included querns, grinding, rubbing and sharpening stones of various kinds; axes, hammer-stones and mace-heads or ringstones; flat oval pallet stones made from selected river pebbles worked into shape by a little grinding; spherical stones of several sizes that appear to have served as missiles, including sling stones, and perhaps as bolas stones where not replaced by balls of hard clay; large pieces of stone used for certain limited architectural and other special purposes. The stone artefact factory at Lewan in the Bannu Basin produced all these objects, and more, and is probably only one of a number of such sites located where supplies of stone are plentiful and varied (Allchin *et al* 1981, in press). Thus the great rivers, their alluvial plains and the margins of the more arid regions immediately surrounding them provided the basic environment of the Harappan world during both Early and Mature Harappan times.

There is ample evidence that many more exotic items were brought from more remote regions, which meant their being transported long distances through the mountains or the desert. Semi-precious stones, especially agate which was extensively used in Harappan jewellery, came from not too distant surrounding areas. The craft of bead-making reached its height in Mature Harappan times, and was one of the long distance exports of the period. Copper was available also at no very great distance, but seems to have played a somewhat minor role in the basic economy of the culture. Gold which was also re-exported in the form of jewellery, came from farther afield, as did a number of luxury items such as lapis, turquoise, conch shell, etc. Such things, although playing their part in building up urban life and trade, cannot be said to be part of the environment as such. Perhaps the need to transport them for long distances across the surrounding deserts played its part in forming the attitude and outlook of the Harappans. Obtaining such items, converting them into marketable goods, and re-exporting them by sea or land routes to other major cultural centres, such as Mesopotamia and the Oxus region, must have been one of the factors that enabled the urban centres to build up and maintain themselves at a level that, in its turn, put increasing strain on the local environment and its natural resources.

Psychologically as well as physically, the Indus and the desert must have dominated the lives of the Harappans. Their environment was hazardous and unpredictable, perhaps most of all for those who dwelt in the larger cities. They were subject to the vagaries of the river that might sweep them away; to earthquakes, local floods and water shortages; perhaps also to famine, disease and military attack. Smaller, more mobile communities could move away with their flocks and herds, and escape some of these calamities, but they too were subject to drought, pestilence and predatory animals. However, cultured, wealthy, technically competent, administratively efficient or commercially sophisticated they became; however they strove to master their environment, no individual or community in the Harappan world could avoid being constantly confronted, and forced to come to terms with the Indus River, upon which all aspects of daily life depended, and the desert that confined their world and had to be crossed to make contact with the world beyond.

The Harappan culture was a highly complex structure, and depended upon a number of factors being kept in a state of balance. The most basic of these factors was the environment upon which the structure, consisting of a number of interdependent groups and communities was built up. Probably the most important element was the system that held them all together and enabled the whole structure to function harmoniously. So long as all the essential elements were there, the Harappan way of life continued. When one major factor changed, whether it was an environmental factor or a breakdown in the system, it must have been like removing a brick from an arch. The fine ecological balance achieved within the environment of the Indus

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

region would react quickly, and once the arch began to give way it would rapidly collapse entirely.

REFERENCES

Allchin, B. 1976. The Discovery of Palaeolithic Sites in the Plains of Sind and their Geographical Implications. *The Geographical Journal*. 142(3); 471-489.

———. 1979a. The Agate and Cornelian Industry of Western India and Pakistan. In *South Asian Archaeology 1975*. J.E. von Lohuizen-de-Leeuw ed. 91-105.

———. 1979b. Stone Blade Industries of Early Settlements in Sind as Indicators of Geographical and Socio-economic Change. In *South Asian Archaeology 1977*. M. Teddei ed. 174-211.

———. 1982. Substitute Stones. Paper read at the *Seminar on the Harappan Civilization* Srinagar, 1979.

Allchin, B. Goudie, A. and Hegde, K.T.M. 1978. *The Prehistory and Palaeogeography of the Great Indian Desert*. London.

Allchin, F.R. 1980. Antecedents of the Indus Civilization. *10th Annual Mortimer Wheeler Archaeology Lecture* read at the British Academy; October 1980.

———. 1982. The Legacy of the Indus Civilization. Paper read at the Seminar on the Harappan Civilization, Srinagar, 1979.

Allchin, F.R. *et al* 1981. Paper in *South Asian Archaeology, 1979*. H. Hartel ed. Berlin.

Burnes, A. 1834a. *Travels into Bokhara*. London.

———. 1834b. Papers Descriptive of the North-West Frontier of India: the Thurr Desert: Jodhpur and Jaysalmer. *Journal of the Royal Geographical Society*. 4,1.

———. 1835. Memoir on the Eastern Branch of the Indus river. *Transactions of the Royal Asiatic Society of Great Britain and Ireland*. 3; 550-588.

Chakrabarti, Dilip K. 1977. India and Western Asia – an Alternative Approach. *Man and Environment*. Vol. 1; 25-38.

Fairservis, W.A. 1967. *The Origins, Character and Decline of an Early Civilization*. New York: Novitates 2302.

Glennie, K.W. and Evans, G. 1976. Reconnaisance of the Recent Sediments of the Ranns of Kutch. *Sedimentology*. 23; 625-647.

Gupta, S.K. 1972. Chronology of the Raised Beaches and Inland Coral Reefs of the Saurashtra Coast. *Journal of Geology*. 80; 357-361.

Gupta, S.P. 1979. *Archaeology of Soviet Central Asia, and the Indian Borderlands*. Vol. 2. Delhi.

Jarrige, J.F. 1981. *South Asian Archaeology 1979* H. Hartel, Berlin.

Jarrige, J.F. and Lechevallier, M. 1979. Excavations at Mehrgarh Baluchistan: Their Significance in the Prehistorical Context of the Indo-Pakistan Borderlands. In *South Asian Archaeology 1977*. M. Teddei ed. 1; 463-536.

Lambrick, H.T. 1964. *Sind, a General Introduction*, Hyderabad: History of Sind Series; Vol.1.

Mackay, E. 1937. Bead Making in Ancient Sind. *Journal of the American Oriental Society*. 57; 1.

Oldham, C.F. 1893. The Saraswati and the Lost River of the Indian Desert. *Journal of the Royal Asiatic Society* (N.S.). 34; 49-76.

Possehl, G.L. and Kennedy, K.R. 1973. *Ecological Backgrounds of South Asian Prehistory*. Cornell.

Rydh, H. 1959. *Rang Mahal*. The Swedish Archaeological Expedition to India, 1952-4. *Acta Archaeological*. Ludensia; Series 4,3.

Singh, Gurdip. 1971. The Indus Valley Culture Seen in the Context of Post-Glacial Climatic and Ecological Studies in North-west India. *Archaeology and Physical Anthropology in Oceania*. 4;2; 178-189.

Snelgrove, A.K. 1979. Migrations of the Indus River, Pakistan, in Response to Plate Tectonic Motions. *Journal of the Geological Society of India*. 20; 392-403.

Surajbhan, 1972. Prehistoric Archaeology of the Saraswati and Drishadvati Valleys. (Thesis submitted to University of Baroda).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

47

R.L. Raikes

Mohenjo-daro Environment

It is not possible to consider the physical environment of Mohenjo-daro, by which I mean the complex of climate, soils and the flood-regime of the Indus, without first considering the effect of any out-of-the-ordinary events that may have produced either temporary or lasting changes in at least the morphology of that environment. Chief among such events must be reckoned those famous floods about which so much has been written.

The 'normal' environment of the Indus valley around the end of the third and the beginning of the second millennium B.C. would have been determined, then as now, primarily by climate and geology.

Although several authorities still claim that ecologically significant climatic changes have occurred during the Holocene, I do not myself believe that there is any evidence of such a change (except locally around the newly forming North Sea between perhaps 6000 and 4000 B.C.) in the world generally, or specifically in the Indus valley and its catchment in the past 5000 or so years. Some of the views of others are set out in the Symposium on 'Courses Towards Urban Life' (Braidwood and Willey 1962). Braidwood and Howe, in their contribution entitled 'South-western Asia beyond the Lands of the Mediterranean Littoral', are among those who do not accept significant climatic change in the Holocene. Sankalia, in the same symposium, is somewhat ambivalent while admitting that reliable local data do not exist; Pettioni takes the German view and accepts, as do so many archaeologists from around the North Sea, the existence of a number of climatic phases.

Another apparently dissentient view is that expressed recently in the context of the decline of Mycenae (Bryson *et al* 1974). The authors of that paper demonstrate the theoretical possibility of a globally synchronous 'climatic change' around 1200 B.C. Essentially, what they are writing about is a climatic fluctuation but let it be at once admitted that the ecological effects of such a fluctuation could be as disastrous at the time as those of a sustained change.

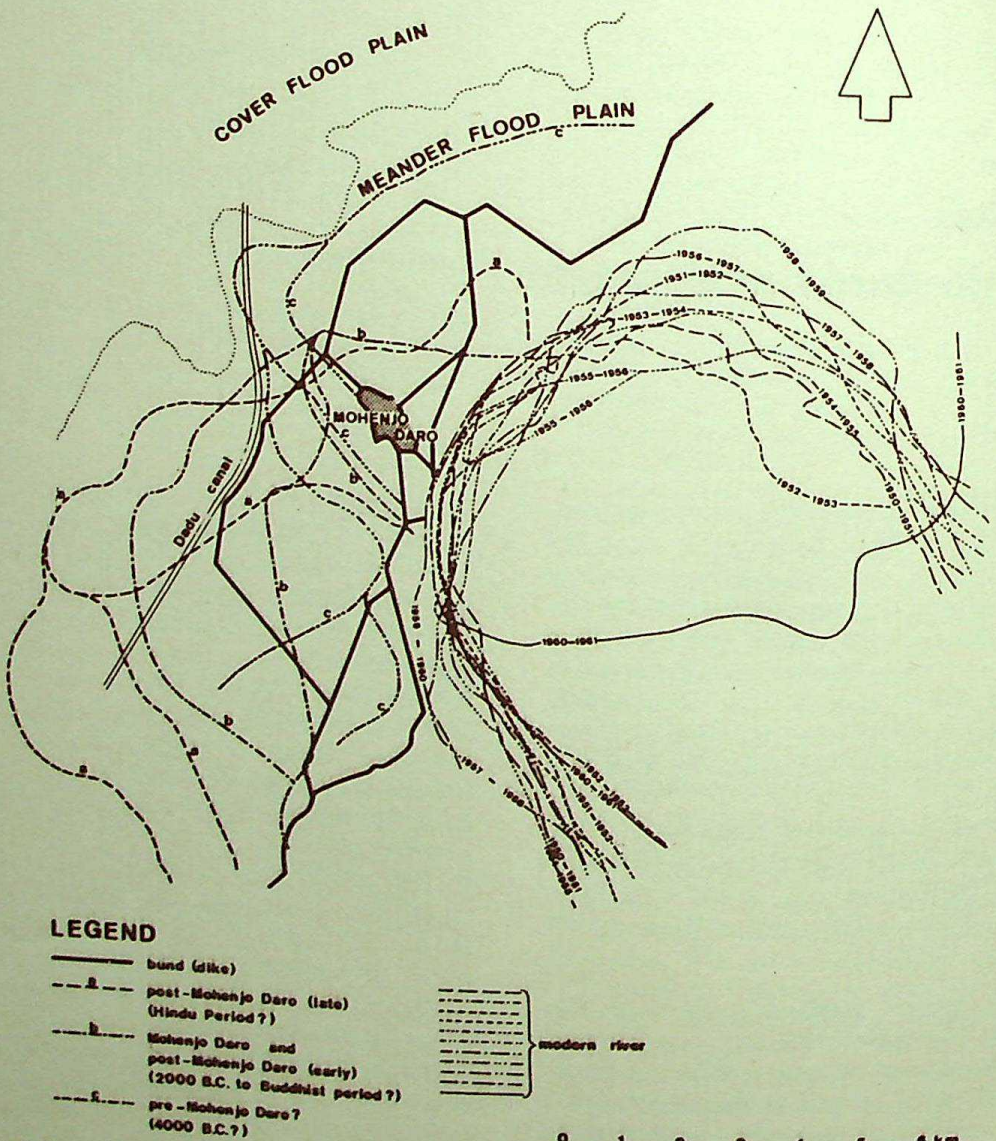
I find everything in that paper very convincing except the unnecessarily long duration proposed for the fluctuation. In any case, it is mentioned mainly to forestall the possible criticism that it has not been taken into account. It must be largely irrelevant to what follows since even half-a-century of exceptionally high snow-melt run-off or monsoon run-off (not both since an increase in one would almost certainly be accompanied by a decrease in the other) could not have caused the vast depths of siltation observed.

This is not the place for arguing the climate case. I have done this already in general (Raikes 1967), while the specific case of the Indus valley for the period with which we are concerned has been argued in an earlier paper (Raikes and Dyson 1961).

This discussion which follows starts from two related assumptions. First, that the climate of second and third millennia B.C. was essentially the same as that of today: in other words, the climatic parameters of that period had virtually the same long-term mean values as they have

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

SHIFTING OF INDUS BED DURING THE LAST 7000 YEARS



today and varied about those means (whether they were annual, seasonal or monthly values) in the same random manner and with the same range of values and frequencies as today. Second, that the present isostatic equilibrium between world-wide ocean-level and ice in polar and glacier storage had already been achieved before the time with which we are concerned. This last statement does not exclude the possibility of subsequent minor changes in sea-level of the order of a few centimetres consonant with short-term variations in ice-storage.

The climate parameters to which I refer are temperature, relative humidity, rainfall and evaporation.

As regards geology, the Indus together with tributaries, drained, then as now, a very large area of the Himalayas, Hindu Kush and Pamirs, the greater part of its flow being derived from snowmelt and monsoon rainfall. The raw materials for the sediments carried by the Indus have always come from those high mountains. From the point where deposition of sediments starts at the beginning of the plains, the banks of the river itself furnish, in flood times, some of silt-load but, since the river is aggrading, more silt is always

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

being re-deposited that re-eroded. The Indus receives now as it did then, some relatively microscopic contributions of water from the terminal underground flow of rivers such as the Nari, Bolan, Mula, etc. as well as the minor surface contribution of tributaries such as the Kabul river. The suggestion has been made (Raikes 1968) that, at certain periods, the Yamuna flowed westwards, down what is known as the Ghaggar, to join the Indus. Indeed, it was specifically suggested that it flowed in this way during the Mohenjo-daro period. This would have had the effect of adding perhaps some 15 per cent to the flow of the Indus.

The people of Mohenjo-daro and of the other towns of the Indus Civilization in Sind (and for that matter in the Punjab), lived along the riverine strip bordering the Indus, in conditions which contained all the possibilities and difficulties of today. We do not know whether they practised irrigation by diversion of water from the river through canals and we are not now ever likely to find traces on the ground of such canals (for reasons connected with those famous floods). Canal-irrigation was already practised in Mesopotamia and contacts certainly existed between there and the Indus region. It is difficult to believe that such a large and populous civilization throve so well in what would have been a very hostile environment indeed, unless in fact quite large-scale canal-irrigation was practised. I, myself, have seen at Mohenjo-daro itself, structures. I pointed these out to Dales as well near the citadel mound which could possibly have been the remains of sluices. The biggest doubt as to their function arises from the fact that they are right in the middle of the city and they could only therefore have been structures of any consequence dealing with water if the central north-south depression represents, as some have thought, a former branch of the Indus.

It is not absolutely necessary, however, to postulate irrigation. For example, Omdurman in Sudan was already a considerable town before irrigation engineers harnessed the Nile. To this day, cultivation is practised on the silt left exposed (and saturated) by the receding flood and all along the *shadouf*, a primitive means of lifting water into small irrigation channels, has been used for millennia. There is evidence of the *shadouf* having been used by the Indus people and it is possible — but improbable — that the civilization was based on it and receding-flood cultivation.

In the normal course of events the people would probably have constructed and maintained some system of flood banks and of sluices through the banks to admit water by canals during the flood period as far as 'back-swamp' areas. Since the Indus flood is an annual and fairly regular (as regards date) event, some system of recording the days and seasons would have been essential.

While it is known that the Indus people cultivated wheat and barley, this raises certain interesting issues, for wheat and barley are winter crops in the Indus valley as they are, for the most part, in the mountains of Baluchistan, and winter is not the season of Indus floods. Winter irrigation requires the construction of barrages and large canals and I very much doubt if the attendant difficulties, which were virtually insurmountable well into the present century, were surmountable then. So we would be back to limited receding-flood cultivation and the *shadouf* for cereal cultivation. One is tempted to think that the latter would have been limited, for energy budget reasons, to the narrow flood plain area between flood banks. The energy budget would have imposed this limit because, however plentiful the manpower (and the *shadouf* is essentially a man-operated pump) those doing the pumping would have to be fed from what their efforts produced.

While Mohenjo-daro and the other cities could certainly have survived as far as their staple foods were concerned on receding-flood irrigation and use of the *shadouf*, it seems unlikely that they would have achieved their evident prosperity without something more sophisticated.

Unfortunately for Mohenjo-daro, the normal course of events does not seem to have occurred. Without starting by prejudging those floods — for almost all are agreed that floods of some kind were involved — let us examine the evidence that something very out-of-the-ordinary happened. A start can be made by dividing the evidence into categories: factual, reasonable, assumptions and inferences.

The factual evidence consists of the following:

(i) The present level of the flood plain at Mohenjo-daro is approximately +47.6 m m.s.l.

(ii) The lowest occupation debris comes from approximately +31.0 m m.s.l.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

(iii) There is evidence of occupation in three boreholes from approximately +36.0 m m.s.l.

(iv) All that part of Mohenjo-daro below the present plain level contains, where excavated or drilled, massive beds of silty clay (of which the exact analysis is known) of a type which could only be deposited in its entirety (*i.e.*, including the clay element) under still water.

(v) That part of Mohenjo-daro, above the present plain-level, contains massive beds of silty clay, in contexts similar to those below ground, up to +57.5 m m.s.l.

(vi) Beds of similar clay occur at Jhukar up to a level of about +57.0 m m.s.l.

(vii) The rate of aggradation of the flood plains of large flood-rivers such as the Indus and Ganga in the Indian subcontinent is between 1.5 m and 2.0 m per 1000 years.

(viii) The topmost levels of Mohenjo-daro and the upper slopes of the present mounds (that is, the parts now projecting above the flood plain) show a debased form of the mature civilization.

(ix) In 1819 there was a tectonic upheaval, farther south in Sind (south-east of Hyderabad), described by Burnes, which resulted in the formation of the Allah bund. The (literally) underlying causes of this are unknown but the descriptions of eye-witnesses at the time suggest eruptive mud. In any case, a natural dam, several tens of kilometres in length, was formed across the eastern (Nara) branch of the Indus.

(x) Eruptive mud and mud-volcanoes occur along the Hala Range, west of the Bela Plain, and along the coast from Hingol westward and have been described in detail (Snead 1964).

(xi) The Miocene and Pliocene formations that sometimes include these mud strata occur also near Sehwan.

(xii) No Indus Civilization sites have been reported from the Indus flood-plain south of Chanhu-daro although several are known along the flanking hills and terraces to the west.

(xiii) The sedimentation regime of a river depends, assuming fairly constant source of sediments, on the discharge, the slope and the flood-plain area. The slope is ultimately governed by the drainage datum which is the level (in this case that of the sea) at which the river discharges.

(xiv) The successive re-buildings of the city from the lowest level of somewhere between +31.0 m and +36.0 m up to 57.5 m are all evidently the work of the same people even if a relatively debased architectural style became evident near the upper limit: the longest serious estimate put forward for the duration of their culture is approximately 800 years. So, accepting this for the moment, although I do not agree with it, the build-up of silts occurred somewhere between about 2300 B.C. and 1500 B.C. (Note: these dates are now probably considerably too low.)

(xv) There are then the facts of more than 20 metres of siltation in this short period; of no prior siltation of this kind (as evidenced by the bore hole); and of no subsequent siltation. These are the facts that require an out-of-the-ordinary explanation and make it impossible to accept claims that the accumulation of silt *during the occupation of Mohenjo-daro* was caused by normal overbank-spill flooding.

The reasonable assumptions may be considered as consisting of the following:

(a) That the climate at the end of the third and the beginning of the second millennia B.C. was essentially the same as that of today. Sind, therefore, from Sukkur to the sea was, then as it would now be without irrigation, a desert through which meandered the Indus within a wide flood plain which was inundated each summer. The exact position of the flood plain at any time, in the absence of man-made flood banks, would have depended on the factors — natural levee formation, coriolis effect, etc. — controlling meander formation and overbank spill.

(b) The buried 17.0 metres or so of Mohenjo-daro mean that the *whole* flood plain rose by at least that amount during the occupation of the city up to a level corresponding with the present flood plain. That is a statement of fact of which facts (i) and (ii) allow no other interpretation. In other words, if aggradation by normal sedimentation were involved, we would have to accept a rise of flood-plain level of 17.0 metres during the occupation of the city. Let us put it rather liberally at 800 years and we get a rate of 20 metres or so per 1000 years or ten times the maximum probable rate.

(c) If the now-exposed part of Mohenjo-daro is included, the rate per 1000 years becomes 33 metres.

(d) If the city were buried at these fantastically high rates of overbank-spill floods and the sediment deposited by them, it follows that either (if (b) is the case) there has been inexplicably no

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

aggradation from the date of abandonment of the city onwards; or (if (c) be the case) that there has been, even more inexplicably, degradation of 10 metres in the same period.

(e) It is a reasonable assumption that the river can only have changed its sedimentation regime so dramatically in response to some entirely extraneous and very dramatic factors or event(s).

(f) That dramatic events can occur is evidenced by the Allah bund which is a fact. It is a reasonable assumption that some event, or a series of events, of the nature of the Allah bund could have caused a change or a series of changes in the sedimentation regime of the Indus.

(g) It is a reasonable assumption that whatever happened at Mohenjo-daro was a complicated process of which the actual mechanisms are not likely to be discovered unless some similar event should happen now.

(h) It is a reasonable assumption that the phenomenon noted at Amri by J.M. Casal, involving a change from predominantly marine snails to predominantly freshwater species, during the period with which we are concerned, is related to a rapid change in the regime of the river.

(i) It is a reasonable assumption that the mud (or silt) which occurs at every level of Mohenjo-daro was deposited under still water conditions: and it is a related and equally reasonable assumption that such conditions can only result from either complete loss of gradient of the river, or a reversal of gradient, or the interposition of some kind of dam which, given the period concerned, must necessarily have been natural dam.

(j) Finally, it is a reasonable assumption that marked tectonic activity was in fact going on in Baluchistan around the beginning of the second millennium B.C. as evidenced by raised beaches, etc.

From all of this the inferences vary from virtually inescapable to hypothetical:

(i) A loss of gradient or reversal of gradient could only be achieved by general tectonic or epeirogenic movement and neither is excluded but, with the historically attested example of the Allah bund before us, it seems unnecessary to postulate either. It should be remembered that, whatever the underlying cause of the Allah bund, its emergence was in fact an evidence of local tectonic movement.

(ii) In the context of Mohenjo-daro's environment, it is not strictly essential to relate any movements in the Indus valley to those in Baluchistan but it must be remembered that anything tending to drive peasant farmers away from their hills could only have increased pressure on an already strained environment in the Indus valley.

(iii) Whatever the mechanism that caused it, the rapid sedimentation of which there is evidence at Mohenjo-daro and elsewhere, must have had a profound effect on the inhabitants. If they had irrigation canals these would have been interrupted; if they relied on receding-flood irrigation, all their timings would have been first upset and then rendered impossible: their gallery forest would have been gradually destroyed from downstream.

(iv) The effect would, in my opinion, have been so profound that it seems almost essential to infer fairly long periods between flooding during which the people adapted themselves to changed conditions. The last few flooding episodes, corresponding with a falling off of standards, may have been more closely spaced or, alternatively, the people then may have come to accept the inevitability of abandoning their site.

I have tried in previous papers — unsuccessfully as I now see very clearly — to describe, in detail, one or more possible ways in which the flooding episodes occurred. All such attempts involve all sorts of assumptions as to the morphology of the Indus plain, including the stability, or lack of it, of the rock control at Sukkur. In a situation in which tectonic movement is postulated, it is not justifiable to assume that any part of the system was unaffected, but violent movement, in the very near vicinity of Mohenjo-daro, can probably be ruled out since there does not appear to be evidence of earthquake damage.

Let it be assumed that the morphology of the Indus flood plain was originally more or less as it is now but with the steeper gradient that a relatively stable Sukkur control and the lowest occupation level require, and the annual discharge of the Indus then was of the order of 40,000 to 50,000 MCM (million cubic metres) allowing for the Ghaggar. It then transpires that a single uplift, of around 10 metres in the neighbourhood of Sehwan, would probably more than accommodate the mean annual discharge and would, with evaporation and vertical infiltration losses, con-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

tinue to do so for a few years. It would require something of the order of 40-50 years for the impounded area to silt up. Originally, I envisaged a breach through the Allah-bund-type barrier but it now seems to me more probable that excess water is likely to have found its way probably around the eastern end of the uplift area and probably at a fairly modest discharge because of the 'routing' effect through the large area of storage.

Archaeological reports on Mohenjo-daro claim that there is evidence for several flood episodes. While I must admit that this claim is not supported by the evidence of sediment, it is not contradicted either. In fact, at least four or five approximately 10-metre uplifts would be required to account for the whole observed depth of flood silt. If, as has been suggested (Raikes 1965), the uplifts were due to volcanic mud intruded under the Indus flood plain silts, it is reasonable to assume that all intrusions would be along the same lines — that of the strike of the postulated Miocene mud formation.

But all this is conjectural and, as I have said earlier, we will probably never know the exact mechanism. A programme of drilling down to the bedrock to the east and north-east of Sehwan could possibly reveal what happened but would be an expensive exercise.

Whatever explanation ultimately emerges must explain two things: first, the gradual burying of Mohenjo-daro under about 27.0 metres of mud and then the re-erosion of a large part of this. Allowing for 9 metres of aggradation since the abandonment of the city, we have therefore to account for the accumulation of 27 metres and the rapid re-erosion of about 19.0 metres. This last estimate may be considerably too high since the total aggradation, since the end of Mohenjo-daro could have been as little as six metres.

One final conjecture may be in order—a conjecture which it will be possible to check only when excavations have been carried down to the virgin soil both within and at the margins of the city. This is, that the original wealth and importance of Mohjenjo-daro were based on a fairly long period of initial stability with the possibility of a primitive but effective irrigation system at about + 31.0 m. If we consider 100 years as 'fairly long', there would have been a normal aggradation of about 15 to 20 centimetres during this period and the vertical growth of Mohenjo-daro would have been accomplished by a normal tellbuilding process.

All subsequent vertical growth would have been of the kind exposed in the existing relatively shallow excavations and dictated by the rapid rise of deposited mud. It is to this period that I would attribute the massive mud-brick platforms and the building-up of house-walls on the original building lines. When all this started Mohenjo-daro must already have been both very important and very wealthy. Otherwise, it would surely have been abandoned long before.

REFERENCES

Braidwood, R.J. and Willey, G.R. 1962. *Courses Towards Urban Life*. Edinborough.

Bryson, R.A., Lamb, H.H. and Kenward, H.K. 1974. Draught and the Decline of Mycene. *Antiquity*. Vol. 189; 46-50.

Raikes, R.L. 1965. The Mohenjo-daro Floods. *Antiquity*. Vol. 39; 196-203.

———. 1967. *Water, Weather* and *Prehistory*. :London.

———. 1968. Kalibangan: Death from Natural Causes. *Antiquity*. Vol. 42; 286-291.

Raikes, R.L. and Dyson, Robert J. Jr. 1961. The Pre-historic Climate of Baluchistan and the Indus Valley. *American Anthropologist*. Vol. 63; 265-81.

Snead, R.E. 1964. Active Mud Volcanoes of Baluchistan, West Pakistan. *Geographical Review*. Vol. 54; 546.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

48

V.N. Misra

Climate, a Factor in the Rise and Fall of the Indus Civilization – Evidence from Rajasthan and Beyond

About fifty years ago, Sir Aurel Stein (1931) and Sir John Marshall (1931), on the basis of their evaluation of the multiple archaeological evidence from Baluchistan and Sind, proposed that climate in these regions during the Indus Civilization period was more wet than it is at present. This theory was accepted and supported by archaeologists like Stuart Piggott (1950) and Mortimer Wheeler (1953), and it held unquestioned sway for three decades. Then in the fifties, American archaeologists began taking an interest in the archaeology of the Indus Valley and neighbouring regions and they brought an anthropological approach to bear on the archaeological problems of this region. Briefly put, this approach looked at cultural evolution in terms of cultural processes in contrast to the older British historical approach which laid more emphasis on events (Fairservis 1961: 51). The introduction of this new approach led to a questioning of several interpretations previously held more or less as facts (Dales 1964, 1966; Raikes 1964). One of these interpretations was the theory of a more wet climate during the Indus Civilization. Robert L. Raikes, a hydrologist with keen interest in archaeology, and Robert H. Dyson, an archaeologist, teamed up in 1961 to critically examine various kinds of evidence adduced by Stein and Marshall in support of their climatic theory (Raikes and Dyson 1961). They came to the conclusion that alternative explanations were possible for each piece of evidence, and therefore, the theory of a more wet climate could not be accepted as proven fact. As an interesting coincidence, another American anthropologist, Walter A. Fairservis, Jr. (1961) also examined the same evidence at the same time and reached a similar conclusion. F.A. Durrani (1965) who did a similar exercise for the lower Indus Valley a few years later, also arrived at an identical conclusion.

Except for a weak meteorological defence of the older theory by Ramaswamy (1968), the matter rested there for a decade until, in 1971, Gurdip Singh revived the theory of a more wet climate and re-kindled interest in the subject (Singh 1971; Singh *et al* 1974). Singh's theory differed from that of Stein and Marshall in three important respects:

(1) The evidence for climatic change was based on palynological rather than on archaeological data.
(2) The climatic change consisted of several fluctuations which covered almost the entire Holocene period in north-west India and not just the Harappan period.
(3) The fluctuations in rainfall were related not only to the growth and decline of the Harappan culture, but also to the origin of agriculture-based life in the 8th millennium B.C. and to its expansion in the 4th and 3rd millennia B.C., in north-west India.

The palynological evidence for Singh's theory came from three salt lakes, namely, Sambhar (27° N; 75° E), Didwana (27° 20' N; 74° 35' E) and Lunkaransar (28° 30' N; 73° 45' E), and one fresh-water lake, Pushkar (26° 29' N; 74° 33' E) in Rajasthan. The first two lakes are situated in the semi-arid belt (25-50 cm average annual rainfall), the third in the arid belt (less than 25 cm

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

rainfall), and the last in the semi-humid belt (50-60 cm rainfall). The climatic evidence from the first three lakes only is relevant to archaeological history.

The climatic sequence based on the pollen record from these three lakes can be briefly summarized as follows:

Phase I: Before 8000 B.C.

Phase I, represented by wind-borne sand deposits at the base of lake sediments, was characterized by a severely arid climate which was unsuitable for habitation for a long time during at least the later part of the last glacial period.

Phase II: Pollen Zone A: c.8000 B.C. — c.7500 B.C.

Phase II is represented by the first sedimentation in the lakes. Rainfall at this time was at least 25 mm more than the present annual precipitation in western Rajasthan.

Phase III: Pollen Zone B: c.7500 B.C. — c.3000 B.C.

A slight decline in rainfall is indicated at the beginning of Phase III, but it was not severe enough to substantially alter the ecological pattern established in Phase II. A noteworthy feature of this phase is an extraordinary rise in carbonized vegetable remains in the lake sediments at all sites. This rise is accompanied by the appearance of the *Cerealia* type of pollen. These two phenomena indicate scrub burning which probably formed the basis of a primitive cereal agriculture.

Phase IV: Pollen Zone C: c. 3000 B.C. — c.1000 B.C.

Phase IV can be divided into three subphases: IVa (c. 3000 B.C. — c.1800 B.C.); IVb (c. 1800 B.C. — c. 1500 B.C.); and IVc (c. 1500 B.C. — c. 1000 B.C.).

Subphase IVa: Pollen subzone C1: c.3000 B.C. — c.1800 B.C.:

Subphase IVa is characterized by a rather sudden and considerable increase in rainfall. Annual average rainfall during this phase was probably at least 50 cm more than the present rainfall in the arid belt. Pollen of the *Cerealia* type, of the same size range as seen in the earlier phase, and the evidence of scrub burning in the form of carbonized remains, continue in this subphase. In chronological terms, subphase IVa sees the rise of Pre-Harappan and, later on, of Harappan culture throughout north-west India. The presence of *Cerealia* type pollen of the same size range in Pre-Harappan levels at Kalibangan together with the unbroken record of *Cerealia* type pollen in the pollen profiles and the evidence of forest burning from three different sites, would lead one to believe that cereal cultivation perhaps, does not start with the Indus Valley Civilization after all. It would seem, in fact, that the practice had existed in the region for a long time, indeed, as has been suggested, from the beginning of Phase III.

It can in fact be argued that the significant increase in rainfall at the beginning of the third millennium B.C. attested by the palaeoecological evidence, played an important part in the sudden expansion of the Neolithic-Chalcolithic cultures in north-west India, ultimately leading to the prosperity of the Indus culture (Singh 1971: 188).

Subphase IVb: Pollen subzone C2: c.1800 B.C. — c.1500 B.C.:

Subphase IVb is a short dry period. In the arid belt the Lunkaransar lake had started drying out while, in the semi-arid belt, the lakes began to turn saline. The beginning of aridity was not synchronous in the arid and semi-arid belts. At Lunkaransar it began around 2000 B.C. while at Sambhar it began around 1000 B.C.

Commenting on the effect of aridity on Harappan culture, Singh says:

The present evidence would sugest that the onset of aridity in the region around 1800 B.C., probably resulted in the weakening of Harppan culture in the arid and semi-arid parts of north-west India but that the preipheral areas of the culture, such as in Gujarat and the Himalayan foot-hills were not affected to the same degree. The extinction of the Indus culture may thus have been initiated through gradual decline as a result of climatic change, but the process may yet have been completed by successive invasions from the north-west by the Aryans. (Singh 1971: 188).

Further,

This dry priod (2000 B.C. - 1000 B.C.), as already pointed out, was perhaps responsible for the wide cultural gap between the decline of the Harappan culture and the beginning of the succeeding Painted Grey Ware culture, generally put between 1000 and 600 B.C. and tentatively associated with the colonization of impoverished land (Ghosh 1952). The weight of analytical and stratigraphic pollen evidence favours a climatic determination of the events of this period (Singh *et al* 1974: 498-99).

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Subphase IVc: c.1500 B.C. — c.1000 B.C.:

Subphase IVc is represented by a slight reversal to a relatively weak wetter interval, lasting up to about 1000 B.C.

Phase V: ? Early Centuries A.D. to the Present

Phase V is known only from Lunkaransar, and is dated, in the absence of ^{14}C dates, on the basis of the rate of sedimentation. The pollen assemblage reflects more or less the present conditions in the area. There is hardly any evidence of either cereal cultivation, tree vegetation or the existence of any aquatic species in the area. The vegetation, on the whole, seems to comprise a typical 'Sand Formation' type, as presently seen in the Lunkaransar region (Singh *et al* 1974: 496).

Singh's evidence for a wetter climate during the Harappan period has been questioned by scholars on palynological (Vishnu-Mittre 1972, 1978), archaeological (Thapar 1977; Pande 1977) and a combination of these and other grounds (Flam 1976; Seth 1978).

The purpose of the present paper is not to examine or question the evidence for climatic changes put forward by Singh. For one thing, not being a palynologist, I am not qualified to assess the pertinent data. For another, having examined the stratigraphic record at several salt lakes (Pachpadra, Sambhar, Kuchaman, Didwana, Tal Chhapar and Malhar) and on numerous sand dunes in Rajasthan during the last five years, I am aware that the sedimentological evidence supports the palynological one for an increase in rainfall during the Holocene period though the degree and duration of this increase is a matter for debate.[1]

My purpose here is to examine the archaeological evidence in so far as it relates to the following hypotheses that Singh has put forward:

(1) A rise in rainfall around 8000 B.C. in Rajasthan was responsible for the emergence of cereal agriculture in north-west India around 7500 B.C.

(2) An exceptional rise in rainfall around 3000 B.C. accelerated the expansion of farming-based settlements in the region and also caused the prosperity of the Harappan culture.

(3) A decrease in rainfall around 1800 B.C. led to the decline of the Harappan Culture; and

(4) The aridity between 2000 B.C. and 1000 B.C. was responsible for the cultural gap between the Harappan and the Painted Grey Ware cultures.

To test these hypotheses, we will:

(i) Review and examine the available archaeological evidence from Rajasthan, particularly from the semi-arid and arid zones (the area in which the lakes that produced the climatic sequence are located) **(figs. 48.4-5).** If cereal agriculture had emerged in the area as early as 7500 B.C., we should expect to find, in the archaeological record of c.7500 B.C. — c.4000 B.C., mounds, pottery, querns and rubbers, bones of domesticated animals and other traits traditionally associated with an agriculture-based life;

(ii) Examine the evidence for the diffusion of Harappan settlements in a diachronic perspective in and around Rajasthan and see whether climatic fluctuations or some other factor — like the shifting of river courses — explains the fluctuating fortunes of the Harappan Culture better; and

(iii) Examine the archaeological evidence to discover whether there is a gap between the Harappan Culture and the Painted Grey Ware culture.

Environmental Setting Of Rajasthan

Before proceeding with the review of the archaeological evidence, it will be helpful if we briefly summarize the present environmental situation in Rajasthan.

Rajasthan is fairly and neatly divided into two distinct physiographic, climatic and, to some extent, cultural regions by the Aravalli hills which run across the state in a northeast-southwest direction. The Aravallis attain their maximum width and height in the southern part around Udaipur. They narrow and flatten considerably in the central part around Ajmer, but again widen near Alwar. Much of the eastern part is a rocky upland ranging in height from about 600 m in the south to 150 m in the north and east. There is a large network of mostly seasonal rivers all of which rise in the Aravallis. The rivers in the extreme south flow into the Mahi-Sabarmati, in the centre into the Chambal and in the extreme north-east into the Yamuna. Annual rainfall varies from 300 mm in the west to 600 mm in the east. Because of adequate moisture the vegetation cover is fairly abundant and the soil produces rich crops of rice, cotton, sugarcane, maize, wheat, mustard, etc. Rocky uplands provide

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

pasture for sheep, goats, cattle and camels.

In contrast, the larger western part is essentially a flat alluvial plain ranging in height from 100 m in the south to 250 m in the north. A large area in the centre along the Aravallis, comprising parts of Jodhpur, Nagaur, Sikar, Jhunjhunu and Churu districts is, however, between 300 and 400 m high. It has either been tectonically uplifted in recent geological times (Cenozoic) or, more likely, was an extension of the eastern uplands from still earlier times. The flat monotony of the plain is relieved by occasional isolated hills and by numerous dunes in the northern and western parts.

The south-eastern corner of the plain is drained by the Luni and the Banas rivers which rise in the Aravallis and flow into the Rann of Kutch. These rivers as also the many tributaries of the Luni, are all seasonal monsoonal streams. The greater part of the plain, north and west of the Luni, is conspicuous by the total absence of any flowing drainage or even dry channels. Only in the extreme north-west corner is present the dry bed of the Ghaggar which originates in the Himalayas and, passing through the Punjab, Haryana and Rajasthan, crosses into Pakistan. This part is geographically, therefore, an extension of the Punjab-Haryana plains. In the north-eastern part, a number of ephemeral streams rise in the Alwar Aravallis and flow east and north into the Yamuna or north to dry up in the sands in Haryana. In the drainage-less plain there are, however, a number of dry salt lakes or *playas* of varying sizes which receive the scanty run-off from surrounding hills and dunes.

The annual rainfall ranges from 400 to 300 mm in the east through 300-200 mm in the centre to less than 200 mm in the west. The relatively moist country near the Aravallis is known as *Godwar* while the semi-arid and arid region to the west is known as *Thal* (from which the anglicized Thar). Because of the low rainfall, vegetation cover is thinner than in the eastern part. Both alluvial and aeolian soils are quite fertile, but except where irrigation facilities have been created in recent times, no winter crops can be raised. Agriculture consists of rainy season crops like *bajra (Pennisetum typhoideum), Jowar (Sorghum vulgare), moth (Phaseolus aconitifolius,* Jacq.) and *sesamum (Sesamum indicum).* Pastoralism based on cattle, sheep, goat and camel is the mainstay of rural economy. Because of frequent failures of rain and consequent droughts, both animal and human populations are forced periodically to migrate to greener regions to the south and east.

Pre-Neolithic Cultural and Environmental History of Western Rajasthan

Research during the last forty years has produced considerable evidence for the geomorphic, environmental and archaeological history of both western and eastern Rajasthan **(fig. 48.1)**. Our concern here is mainly with the former region though we will briefly summarize the evidence from the eastern part as well as to show the parallelism between the two. With respect to western Rajasthan — despite the differing opinions on details held by various workers — the broad picture can be briefly summarized as follows.

In the early Quaternary, the semi-arid and arid regions had a well-integrated and high energy bedload, braided, drainage system originating perhaps both in the Aravallis and the Himalayas. Geomorphic evidence of this sytem survives in the form of an extensive and massive gravel ridge (Jayal Formation) in Nagaur and Jodhpur districts (Agrawal *et al* 1980a; Misra *et al* 1980, 1982a). Subsequent to its formation, this ridge was tectonically uplifted. The rejuvenation of the alluviated land surface induced by tectonic activity helped the rivers to carve out new valleys in the Jayal Formation. This post-Jayal formation drainage sytem is represented by low gradient, highly sinuous streams with wide flood plains and associated lakes and pools. In these streams and lakes extensive and thick deposits of calcareous silts and clays were formed (Amarpura Formation). Man appeared in the region at this stage. Rich Acheulian assemblages are found in the middle levels of the Amarpura Formation as well as on the surface of the gravel ridge of the Jayal Formation. (Agrawal *et al* 1980a; Misra *et al* 1980, 1982a, 1982b). In the upper part of the Amarpura Formation, Middle Palaeolithic assemblages are found in the semi-arid region (Misra *et al* 1982a). Similar assemblages also occur in the palaeo-channels in the arid region (Allchin *et al* 1978). Probably during the earlier part of the Upper Pleistocene, this drainage became disorganized and eventually totally defunct, possibly due to a combination of climatic deterioration and tectonic events which diverted the Himalayan drainage westwards. The resultant scarcity of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

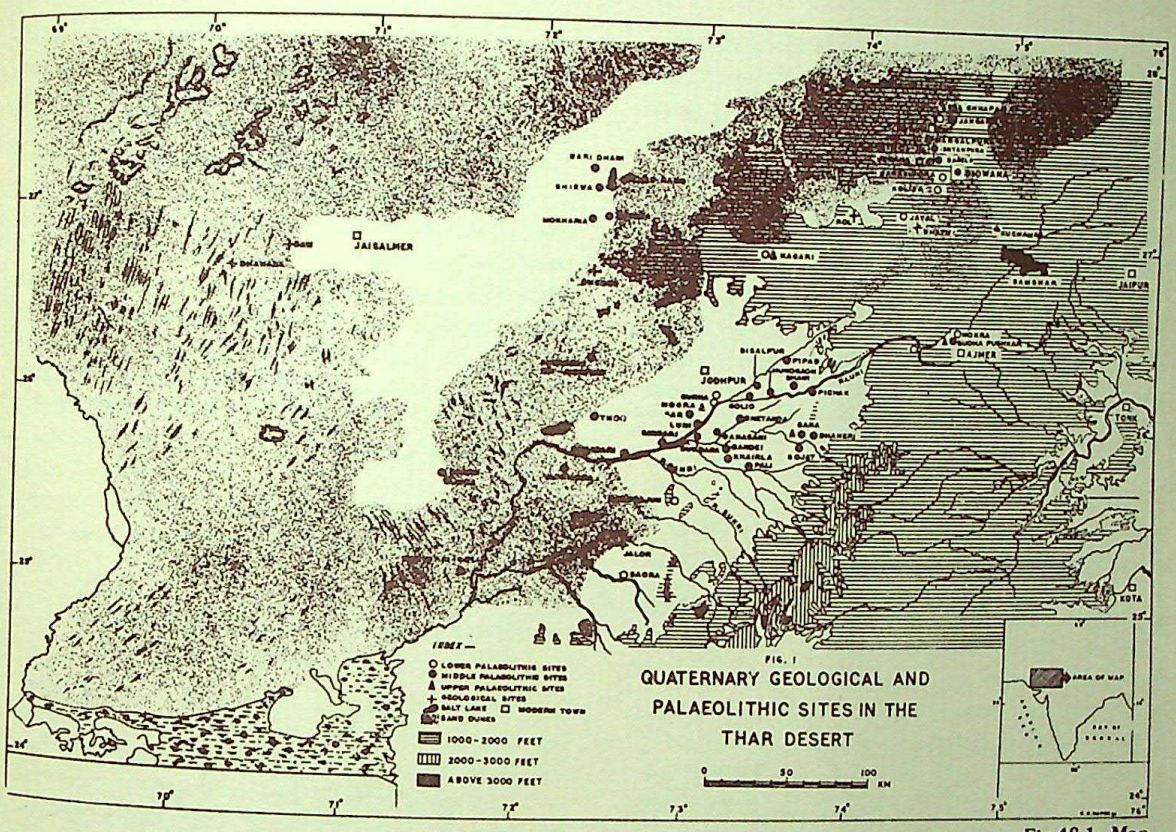


FIG. 1
QUATERNARY GEOLOGICAL AND PALAEOLITHIC SITES IN THE THAR DESERT

Fig.48.1. Map

surface water apparently forced the Middle Palaeolithic man to migrate south where the Luni system continued to function. Middle Palaeolithic assemblages are found in the Luni alluvium as well as on lime-stone rock outcrops (Misra 1961). The *playas* of north and west Rajasthan are, in our opinion, remnants of this drainage system. The series of palaeo-channels located in the Thar Desert in recent years with the aid of aerial photographs, landsat imagery and field work (Ghose *et al* 1979, 1980; Pal *et al* 1980) probably belong to this drainage system.

Sometime during the later part of the Upper Pleistocene, the deterioration in climate and extinction of the drainage sytem seem to have caused a near total depletion of vegetation cover and triggered powerful aeolian activity. This activity caused the extensive formation of sand sheets and sand dunes over much of the western Rajasthan plain as well as in the territories to its north, west and south. (Allchin and Goudie 1971, 1978; Allchin *et al* 1978; Goudie *et al* 1973). The scarcity of archaeological remains of this period shows that environmental conditions supported far fewer people than in preceding periods. This period was not, however, continuously dry. Calcrete deposits at several levels in the dunes at Didwana suggest a number of short wet episodes (Misra *et al* 1982a). A ^{14}C date (PRL-651) obtained on calcium carbonate from one of the upper calcrete deposits is 24710 ± 1220 B.P The *playas* also occasionally carried water as suggested by a ^{14}C date of c. 26,000 B.P. from Malhar, north of Phalodi. The intercalation of aeolian and fluvial sediments at Shergarh trijunction and Gudlai Nadi, both located at the eastern fringe of the arid zone and dated between 38000 and 22000 B.P. and 40000 and 12000 B.P., respectively, also shows the occurrence of wet spells during the arid period (Agrawal *et al* 1980a, 1980b).

Towards the close of the Pleistocene period, a shift in climate leading to increased rainfall seems to have taken place. Initially, the shift was unsteady as indicated by the alternating silt, clay, sand and halite layers in the Didwana lake. A ^{14}C date (PRL—650) from a horizon 1.5 m below the zone dated by Singh (1971; Singh *et al* 1974) to c. 10000 B.P. gives a reading of 12820 ± 370 B.P. But from the beginning of the Holocene, the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

increase in rainfall was greater and its duration longer. This is seen in the thick polleniferous deposits of dark clays (locally known as *Kajalia* because of their *Kajal-* collyrium- like black colour) in the *playas* at Sambhar, Kuchaman, Didwana, Tal Chhappar, Malhar, Lunkaransar and Pachpadra. The stabilization of the dunes formed during the arid Upper Pleistocene seems to have taken place during this period. The widespread occurrence of microliths **(fig. 48.2.)** on dunes (including in the core of arid zone) is ample proof that the climate was conducive to supporting large human populations (Misra 1976; Misra *et al* 1982a). The limited faunal material available form Tilwara (Misra 1971) includes both domestic and wild forms. The far richer fauna from Bagor on the eastern side of the Aravallis (Misra 1973a; Thomas 1975) is composed largely of domestic sheep and goat. In eastern Rajasthan at least, the subsistence pattern based on pastoralism had come into existence as early as the fifth millennium B.C. It would be quite reasonable to expect that this same pattern, present even today, was introduced in drier western Rajasthan,

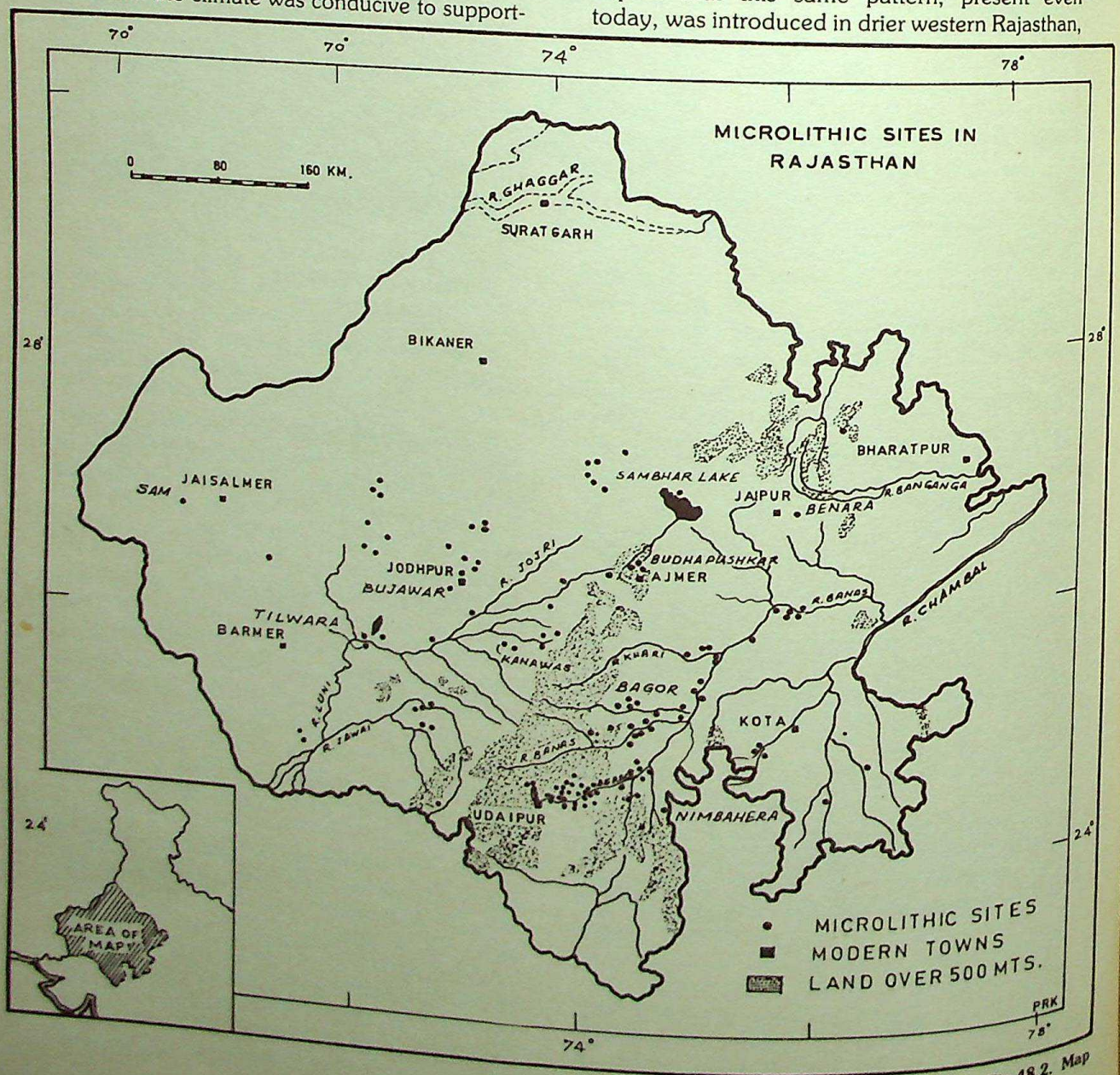


Fig.48.2. Map

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

around the same time.

The evidence for climatic and geomorphic changes from eastern Rajasthan is less dramatic, but that for cultural evolution is equally rich and runs on fairly parallel lines (Misra 1977). Human occupation during the Lower Palaeolithic period was widespread in the Banas and Chambal basins. Middle Palaeolithic cultural remains are less profuse but occur in both these river valleys, while the evidence for the Upper Palaeolithic is as scanty as in western Rajasthan. During the Mesolithic, however, resurgence in human population was marked as in the semi-arid and arid regions west of the Aravallis. A large number of sites **(fig. 48.2)** of this period have been found in Mewar upland on rocky eminences, local dunes and alluvial flats along river banks (Misra 1973b, 1976).

Evidence for Pre-Harappan Farming Cultures In Rajasthan[2]

Against this geographical, palaeo-environmental and cultural background, we will examine the archaeological evidence pertinent to the various hypotheses put forward by Gurdip Singh.

Singh's first hypothesis is that the increase in rainfall in the semi-arid and arid belts of Rajasthan around 8000 B.C. led to the emergence of cereal agriculture in north-west India soon after. On the basis of the evidence from the Near and Middle East, it would be expected that such incipient agriculture would soon lead human populations to a certain sedentariness which would be reflected in formation of archaeological mounds. And on such mounds one would expect to find vestiges of cultural traits—mud or stone structures, pottery, querns and rubbers, animal bones, terracotta objects, stone and terracotta beads — which are usually associated with early farming settlements. Since the increased rainfall postulated by Singh would have been most strongly felt in the area surrounding the lakes that produced the evidence for such rainfall **(fig. 48.5)**, one would expect to find farming settlements in those areas. As the headwaters of the Luni lie within 80 km of Sambhar lake (which is the type locality of Singh's climatic sequence), one would particularly expect to find such settlements along the Luni and its tributaries. One would also expect to find such settlements on the north Gujarat alluvial plain drained by the Mahi, the Sabarmati and other rivers.

What is the archaeological evidence for such settlements? In western Rajasthan, early farming settlements (of the Harappan, Painted Grey Ware and Rangmahal cultures) have been found along the dry course of the Ghaggar river in the north-western corner of the state. But this river, as has been said earlier, originates in the Siwaliks and, passing through Punjab, Haryana and Rajasthan, continues its course into Pakistan. This part of Rajasthan is geographically a part of the Indo-Gangetic Divide (or the Punjab, Haryana and Bahawalpur plains). It would, therefore, be more appropriate to consider the archaeological evidence from this corner of Rajasthan along with that from the rest of the Indo-Gangetic Divide. At this stage it is more relevant to look for evidence of farming settlements in the rest of western Rajasthan.

In the vast expanse of western Rajasthan (comprising districts of Sirohi, Pali, Jodhpur, Didwana, Jhunjhunu, Churu, Bikaner, Jaisalmer and Jalor) such settlements are conspicuous by their total absence. Not only are no settlements of the Neolithic-Chalcolithic age known but even settlements of the Painted Grey Ware (PGW) or Northern Black Polished Ware (NBPW) cultures or any others of comparable age are unknown. The earliest settlement in this region is Bhimmal in the district of Jalor which does not date earlier than the Gupta period. Several mounds located by us during our explorations over the last four years (Barawas near Tilwara, district Barmer; Dhanpur, south of Jalor, district Jalor; Got-Manglod, east of Jayal, district Nagaur) all appear to be less than two thousand years old. The site of Sambhar on the eastern margin of the Sambhar lake in the district of Jaipur is datable at the earliest to c. 4th century B.C. (Sahni 1941) and falls outside the desert region.

The only archaeological evidence from the region which can be related to the Chalcolithic period consists of: *(a)* one flat copper celt from Elana in the district of Jalor (Agrawala 1979: 92); *(b)* a hoard of 103 copper objects (celts, chisels, ordinary and channel-spouted bowls, curved thin blades and rings) from Kurada, in the district of Nagaur (Agrawala 1980); and *(c)* two flat copper celts from Sabania, tehsil Lunkaransar, in the district of Bikaner (*IAR.* 1968-69: 69). My personal examination of the find spot of the Elana celt in 1979 revealed that it was found in an interdunal cultivated depression. No other archaeological

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

material was present at or around the find spot. A low mound, a couple of hundred metres away from the spot and now under cultivation, appears to be of a fairly late age. R.C. Agrawala (1980: 89-91) who examined the site of Kurada also did not find any habitation remains there. The Sabania celts were found by a farmer while ploughing his field, and no other archaeological material is reported to be associated with them. The context of these copper objects is similar to that of the Copper Hoards of the middle Ganga plains. At this stage, we do not know their age or cultural association. They may, however, be related to itinerant metal smiths who may have occasionally travelled through the desert to supply the metal needs of the Harappans in Kutch, Saurashtra and the Ghaggar valley.

In informal discusions with Gurdip Singh on several occasions over the last few years both in India and Australia, this author has pointed out to him this lack of archaeological evidence necessary to support his hypothesis. His answer has been twofold: (1) this may be due to a lack of adequate field work; or (2) the mounds of sites may have been buried under sand. Neither of these answers seems justified.

The Luni valley has been intensively explored, since 1958, by us but we never came across any mounds of Neolithic-Chalcolithic or the Early Iron Age. In 1966-67, Leshnik and this author carried out an intensive exploration of the north Gujarat plains and the lower Luni valley with the express aim of looking for early farming settlements, but we failed to find any evidence of them. In all this area but particularly in the lower Luni valley, bordering the Rann of Kutch, we came across scattered pottery at many places **(fig. 48.3),** but all these were of very recent date and were evidently the result of frequent abandonment of villages due to drought and famine so endemic in this region. Between 1971 and 1976, both the north Gujarat and west Rajasthan plains were extensively explored by B. Allchin, A. Goudie and K.T.M. Hegde (1978), but they too did not come across any prehistoric or early historic mounds. From 1976 onwards the greater part of the western Rajasthan plain has been intensively and extensively explored by archaeologists and other scientists from the Deccan College, Pune; the Physcial Research Laboratory, Ahmedabad; the Central Arid Zone Research Inistitute, Jodhpur; and the Australian National University, Canberra (Agrwal *et al* 1980; Misra *et al* 1980, 1982a, 1982b), but this search too, has been quite fruitless as far as early farming settlements are concerned

Gurdip Singh's second explanation appears equally untenable. For one thing, there is no evidence of massive aeolian activity after 2000 B.C. that would have buried all older mounds under sand. A large number of still older Mesolithic sites are preserved on the surface of the dunes. Secondly, if sand has engulfed the mounds in western Rajasthan, one would expect it to have done the same more effectively in more arid Cholistan to the west. But Mughal's explorations, in recent years, have brought to light,several hundred farming sites of different periods in that region (Mughal 1981).

Though one can never rule out the possibility of new archaeological evidence turning up even in an intensively explored region, the position, as it stands today,is that there is absolutely no evidence of farming-based cultures in western Rajasthan (outside the Ghaggar valley) and the north Gujarat plain in prehistoric times.

It can, therefore, be safely asserted, on presently available archaeological evidence that increased rainfall between 8000 B.C. and 2000 B.C. did not lead to the emergence of agriculture in western Rajasthan and north Gujarat.

This archaeological situation from the region of the salt lakes that produced the evidence of higher rainfall is in sharp contrast to that from the semi-humid region of eastern Rajasthan. Here,in the valleys of the Banas and its tributaries in the districts of Udaipur, Chittorgarh, Bhilwara, Ajmer and Tonk, a large number of settlements of the Ahar culture dated between 2100 B.C. and 1200 B.C. have been found (Misra 1968). Further north in Bharatpur, Jaipur and Sikar districts, a number of settlements of Ochre Coloured Pottery (OCP) and Ganeshwar cultures have been found in the valleys of the rivers Banganga, Gambhir, Dohan, Krishnavati and Kantli that rise in the northern flanks of the Aravallis and flow north-east into the Yamuna or northward into the sandy plains of Haryana (Agrawala 1981). The Ganeshwar culture sites in this area, particularly those in Sikar district, are very rich in copper objects (Agrawala 1978, 1981). Obviously, the ecological explanation for these sites lies in the plentiful availability of copper in the Khetri belt which may have been exploited since Harappan times.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Because of limited published evidence, our knowledge of the nature of these sites (their size and the archaeological material available on them) is very inadequate. Their relationship with the Early and Mature Harappan sites of the Ghaggar valley and with the Late and Degenerate Harappan sites of the Yamuna valley is far from clear. However, it would be unrealistic to relate the early farming settlements of Mewar and north-east Rajsthan to increased rainfall in western Rajasthan, particularly in the light of the total absence of such settlements in the latter region.

culture and its relationship with the ecology of the regions where it is found.

Harappan culture, however, is no longer the unitary phenomenon it was thought to be even as late as thirty years ago. In its comprehensive definition, this culture covers a period of more than one millennium and a geographical area of nearly 800,000 sq. km. It did not happen over all this area at one and the same time. As the culture diffused from its nuclear area, it underwent evolution and transformation. The differences between the earlier and later phases of this

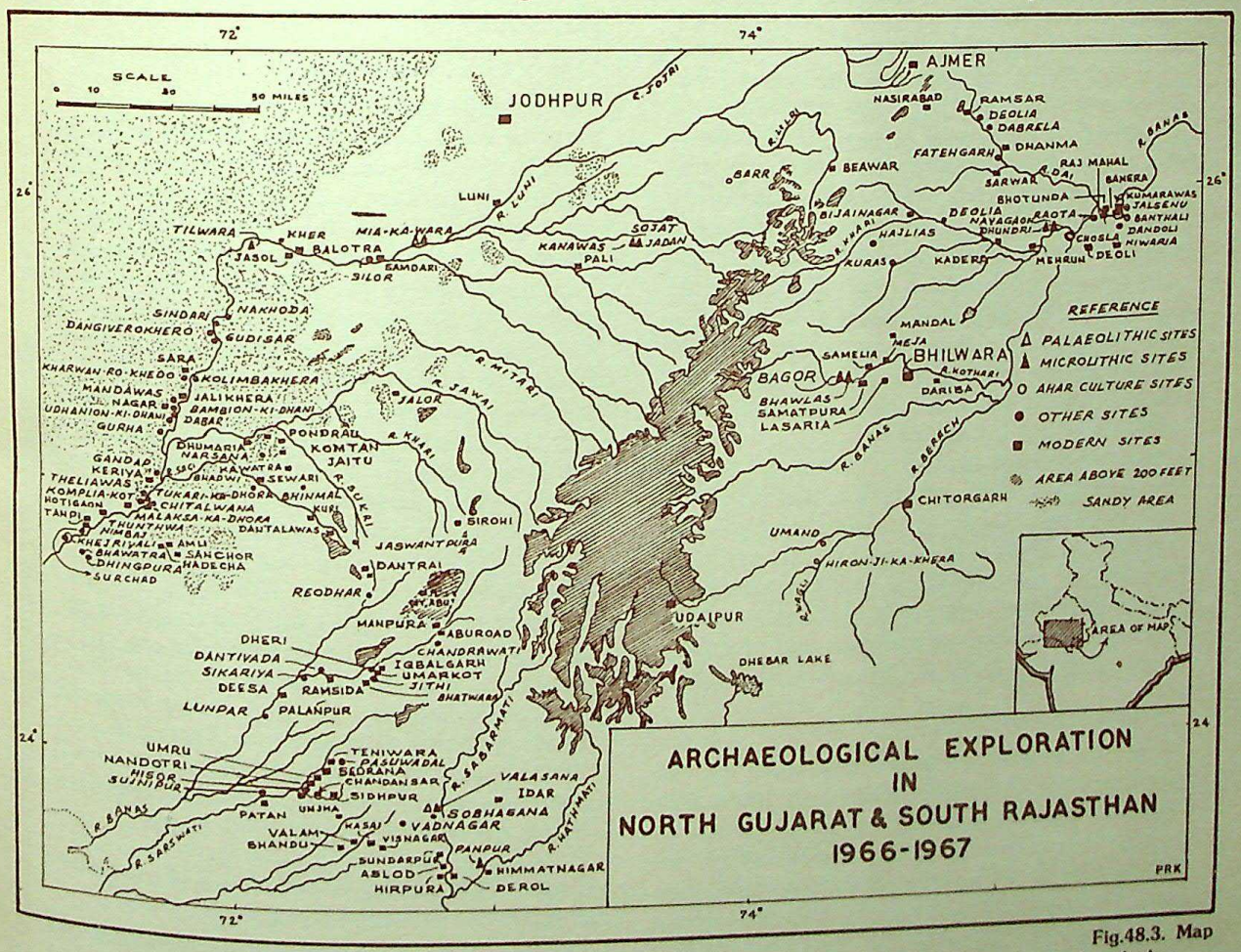


Fig.48.3. Map

The Geographical Distribution Of The Harappan Culture

The second hypothesis of Singh is that increased rainfall around 3000 B.C. was a causative factor in the development of Harappan culture. To examine this hypothesis it is necessary to have a clear picture of the geographical extent of that

culture are clearly marked. To speak of the Harappan culture without reference to its evolutionary stages can, therefore, be quite misleading (Possehl 1980: 2). Although this is not the place to go into details of various evolutionary stages of this culture, a brief outline of them is essential to understand the role of climate *vis-a-vis* other factors in the rise and fall of the Harap-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

pan culture.

On available evidence four phases have been distinguished: (1) Early Harappan, (2) Mature Harappan, (3) Late Harappan, and (4) Degenerate Harappan.

The essential characteristics of these phases can be summarised as follows:

(1) Early (Pre-Urban) Harappan

This phase can be equated with R.J. Braidwood's (1960:150) 'sub-era of the expanded village-farming community' hovering on the threshold of urbanization. The terms commonly used for this phase in archaeological literature are Pre-Harappan, Kot Dijian, Amrian, and Kalibangan I, but Mughal (1970, 1980, 1981) has emphasized the commonness of several cultural traits between this and the Mature Harappan phase. These traits include pottery shapes and designs, fortifications, developed domestic architecture, occurrence of the bull in faunal remains and in terracotta, toy cart frames and wheels, triangular terracotta cakes, chert blades and presence of lapis lazuli at least at some sites showing long distance trade. Pottery of this phase is wheel made, sturdy and varied, and is decorated both by painted and incised designs. Though the process of evolution from this phase to that of full urbanised Harappan culture is still unclear, the near complete geographical overlap between Pre-Harappan and Mature Harappan phases, the chronological priority of the former, and the continuity of cultural tradition from the former to the latter are strong enough reasons to agree with Mughal in calling this stage Early (or Formative) Harappan.

Mature (Urban) Harappan

This phase is characterized essentially by the development of cities and towns and, by implication, of such traits as writing, a high degree of craft specialization, and monumental architecture. There was remarkable standardization and homogeneity of material culture throughout the Harappan geographical region during this phase. It represents the peak of economic, social and political achievement of the Harappan society. Archaeological criteria for identifying this phase of the Harappan culture can be taken to be the same which Sir Mortimer Wheeler (1961:250) considered essential for a culture to qualify for the use of the qualification of 'Indus'. These are: (i) Indus seals; (ii) Indus script, whether on seals or on pottery; (iii) certain distinctive decorative motifs on pottery, e.g. intersecting circles, scale-pattern, pipal leaves, rosettes and peacocks in the Indus manner; (iv) certain distinctive ceramic forms, e.g. goblet with pointed base, cylinderical vessels with perforations (colanders), tall jars with S-shape profile and ledged rims, and 'fruit-dishes' or 'dishes-on-stand', though these last may occur outside the Indus culture proper; (v) triangular terracotta 'cakes'; (vi) kidney shaped inlays of shell or faience; (vii) certain beads, notably discoidal with tubular piercing.

Late (Post-Urban) Harappan

This phase is marked by a decline and abandonment of cities and a reversal to rural economy (Dikshit 1976b; Ghosh 1979; Gupta 1979). There was, however, a considerable expansion of the settlements to the south and east for reasons which will be briefly touched later on. Perhaps as a consequence of the collapse of the political system the standardization and homogeneity of the material culture of the earlier phase disappeared. It was replaced by regional styles in ceramic shapes and designs as well as in other aspects of material culture. These regional styles are represented by Jhukar culture in the lower Indus valley, Lustrous Red Ware culture in Saurashtra, Cemetery H culture in central Indus (including Hakra) valley, and Late Harappan in eastern Panjab, Haryana, and upper Yamuna-Ganga doab. A number of distinctive Harappan pottery shapes and designs either disappeared or became scarce. Stone blades made on Rohri chert were replaced by small blades made on locally available siliceous rocks. Though there is certainly a decline in material prosperity, a basic continuity of the Harappan cultural tradition is clearly discernible (Possehl 1980: 13-21).

Degenerate Harappan (Ochre Coloured Pottery/Ochre Coloured Ware)

By the time the Harappan expansion extends into the Yamuna-Ganga doab, most Harappan traits disappear and the culture is so impoverished that its ties with the ancestral Harappan are definitely blurred. The settlements of the degenerate phase are small and of short duration, and the evidence for domestic architecture is poor. The pottery is ill-fired and susceptible to easy wear. However, links in pottery shapes and designs not only with

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

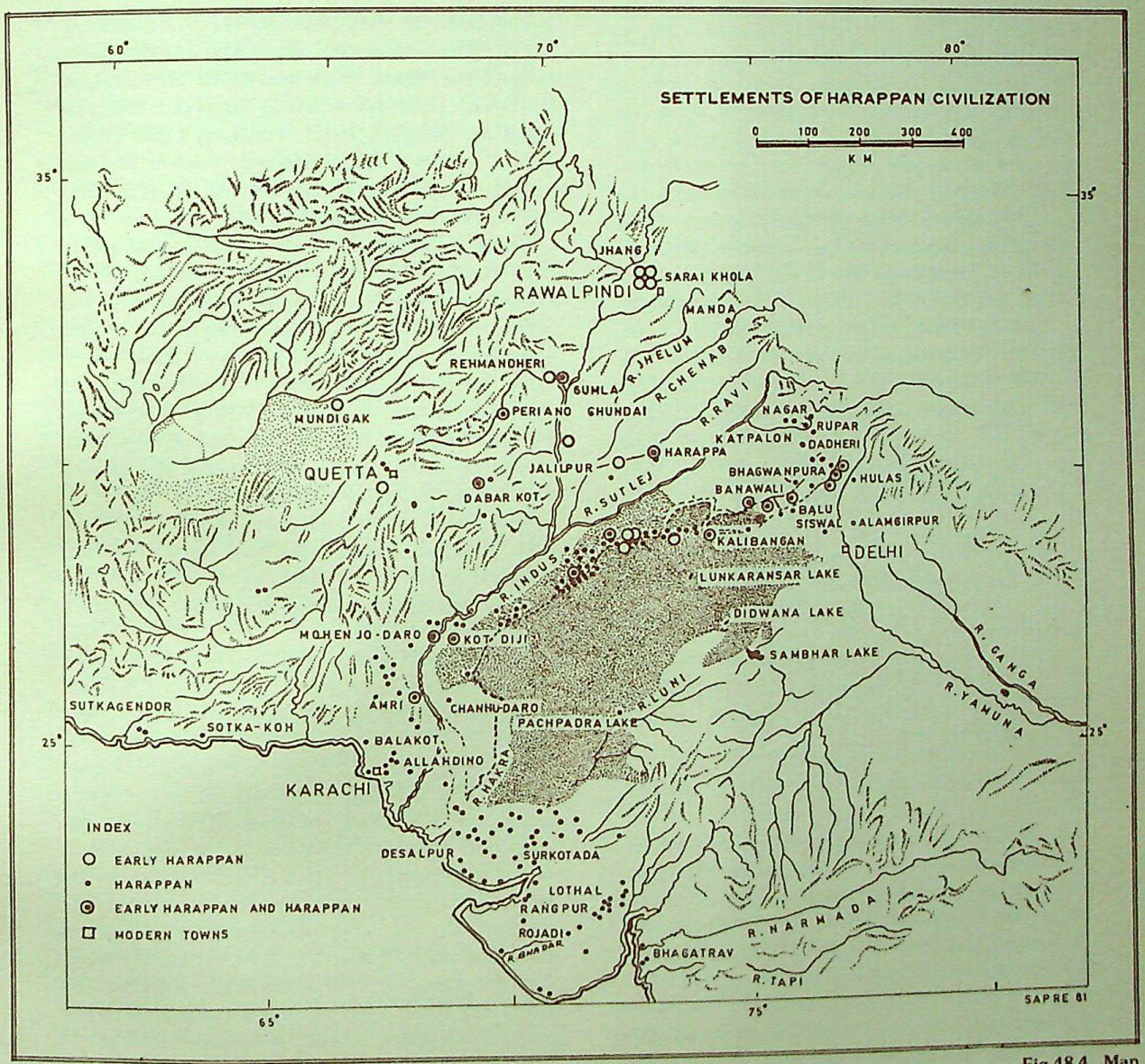


Fig.48.4. Map

the Late Harappan culture but sometimes also with the Early Harappan culture are clearly discernible (Dikshit 1979a). Indeed, in the former region on a number of sites both Late Harappan and Ochre Coloured Pottery (OCP) or Ochre Coloured Ware (OCW) cultures are represented. Because of this situation, a tremendous confusion prevails (Sharma 1971-72). Some scholars would like to designate most OCP sites Late Harappan (Sharma 1971-72: 21-24; Suraj Bhan 1971-72: 16-21), and restrict the use of the term OCP only to a few sites like Bahadarabad, Atranjikhera, Lal Qila and Saipai; others would regard all OCP as nothing but Late or impoverished Harappan (Ghosh 1965; Possehl 1980: 17-18); and a third group (Lal 1954-55, 1968, 1971-72; Gaur 1971-72; Gupta 1971-72: 7-8) would treat OCP as a distinct and indigenous culture associated with Copper Hoards and totally unrelated to Harappan culture. In my view, OCP is only a final and impoverished stage of the Late Harappan culture, and its Harappan likeness is progressively hazier as the Late Harappan colonization proceeded further east into central doab

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

and beyond. For this reason I would like to designate this phase as Degenerate Harappan.

In the last three decades there has been a phenomenal increase in the number of newly discovered Harappan sites, and today more than 800 sites of various phases are known (Jansen 1980). We owe this important addition to our knowledge of the Harappan culture mainly to the explorations and excavations done by J.M. Casal (1964), G.F. Dales (1964, 1965, 1966, 1981), A.H. Dani (1970-71, 1975), W.A. Fairservis, Jr. (1979), Henry Field (1959), Louis Flam (1981), J.F. Jarriage (Jarrige and Enault 1973), R.M. Mughal (1970, 1972, 1973a, 1973b, 1974 and 1981), and J.G. Shaffer (1978) in Pakistan, and by R.S. Bisht (1976, 1977), Katy F. Dalal (*nee* Frenchman) (1972, 1980, 1981), M.N. Deshpande (1977), K.N. Dikshit (1979c, 1980, 1981), A.Ghosh (1952), J.P. Joshi (1972a, 1972b, 1974, 1977, 1978, 1981; J.P. Joshi and Madhu Bala 1979), B.B. Lal (1977, 1979; Lal and Thapar, 1967), Madhu Bala (1981), G.L. Possehl (1980), S.R. Rao (1963, 1973), Y.D. Sharma (1977), U.V. Singh (1977), Suraj Bhan (1971-72, 1972, 1973, 1975, 1977; Suraj Bhan and Shaffer 1978),and B.K. Thapar (1973a, 1973b, 1975) in India.

The picture of the distribution of the four phases of the Harappan culture that emerges from figs. 48. 4-5 can be summarized as follows:[3] Early Harappan culture has a very wide distribution inPakistan and north-west India. However, the number of sites of this phase on the Indus river both in Sind (Balakot, Amri, Kot Diji and Mohenjo-daro) and Punjab (Jalilpur,Harappa, Gumla, Sarai Khola) is very small. In contrast, there is a great density of sites of this phase along the dry bed of the Hakra-Ghaggar. Mughal (1981) has located 41 sites on the Hakra in the Cholistan desert (Pakistan), and more than 60 sites are known on the Ghaggar and its tributaries in Rajasthan, Punjab and Haryana. From this distribution pattern it is clear that the focus of this phase of the Harappan culture was the Hakra-Ghaggar valley. The extension of this farming-based village culture into the Indus and Hakra valleys obviously occurred from northern Baluchistan where this pattern of life was already known to exist from the fourth millennium B.C at sites like Kile Ghul Mohammad and Damb Sadaat (Shaffer 1978), and has now been extended back to the sixth millennium B.C by excavations at Mehrgarh (Jarrige and Lechevallier 1979). The recent discovery of sites associated with Hakra Ware and dated tentatively to the fourth millennium B.C. in the Hakra-Ghaggar valley by Mughal (1981) and Katy Dalal (1981) shows that the village-farming way of life had already been firmly established on this river before the Early Harappan period.

Perhaps contemporary to this phase as also to the ensuing Mature Harappan culture is the culture represented at some forty sites in the Sikar Aravallis which we have designated Ganeshwar culture. These sites are located on the Sabi, the Dohan, the Kasaunti (Krishnavati) and the Kantli rivers which, rising in the Sikar Aravallis, flow eastward into the Yamuna or northward to dry up in the sands in Haryana, though the Kantli may have, of old, flowed into the Drishadvati. From the limited data available from these sites, it would appear that they were essentially settlements of metal smiths who catered to the metal requirements of the Harappan and other contemporary societies.

The geographical area of the Mature Harappan culture largely coincides with that of the Early Harappan except for considerable expansion into Kutch in the south and into the Punjab and Haryana in the north. There is, however, a higher density of settlements in all regions. In the Hakra valley in Cholistan, Mughal (1981: 34) has recorded 166 sites of this phase as against only 41 of the Early Harappan. Further south in the lower Sind, Flam (1981) has located several sites on this river. In Gujarat there are 18 sites of this phase as against only 1 or 2 of the Early Harappan (Possehl 1980: 9). In the Indus valley proper, there are some 16 sites as against only 4 of the Early Harappan. A very noticeable increase is seen in northern Punjab where there are 34 Harappan sites, mainly along the Sutlej, as against only 8 or 10 of the Early Harappan.

The distribution pattern of Late Harappan sites is very different from that of the earlier two phases. In Sind and Punjab (Pakistan) this phase is represented by the Jhukar culture and Cemetery 'H' culture, respectively. Only a few sitess of these cultures are known in these areas. In Cholistan too where this phase is represented by Cemetery 'H' culture there is a decline in the number of sites. Mughal (1981: 34) has recorded only 72 sites of this phase as against 166 of the Mature Harappan. In contrast, there is a dramatic

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

expansion of settlements in Gujarat, northern Punjab, and northern Haryana. And, for the first time, the Harappans cross the Indus valley to found settlements in the Yamuna-Ganga doab. In Gujarat there are 95 sites of this phase as against only 18 of the Mature Harappan (Possehl 1980: 9). In Haryana there are 30 sites of this phase as against 24 of the Mature Harappan; in Punjab 85 as against 34 of the Mature Harappan; and, in Yamuna-Ganga doab, 66 as against none of the Mature Harappan. In Haryana and Punjab settlements are located on the upper courses of the several tributaries of the Ghaggar, on the Sutlej (upper course) and its tributaries, and on the tributaries of the Ravi, and in Uttar Pradesh on the tributaries of the Yamuna, mainly in the district of Saharanpur.

A considerable decrease in the number of settlements in Sind, Punjab (Pakistan) and Cholistan and a much higher increase in their number in Gujarat, Punjab (India), Haryana and north-western Uttar Pradesh during the Late Harappan phase can only be explained by large scale migration of Harappan populations from the former to the latter regions. We will look into the probable causes of this migration later on.

Of the final or Degenerate phase of the Harappan culture some 171 sites are known. Only two of these are located in the Ghaggar valley in Punjab and Haryana. The vast majority of these sites are, however, located in Saharanpur, Muzaffarnagar, Meerut and Bulandshahr districts of Uttar Pradesh on the Yamuna and its tributaries. A few sites are found in the district of Bharatpur of Rajasthan, west of the Yamuna, and a few in the central Yamuna-Ganga doab.

The following important points emerge from this survey of the geographical distribution of Harappan sites:

1. As in the case of the Pre-Harappan farming-based settlements, Harappan sites are conspicuous by their total absence in west Rajasthan (except on the dry bed of the Ghaggar) where the lakes that produced the climatic sequence are located. This area receives an annual rainfall from less than 200 mm in the west to 400 mm in the east. Its southern part is drained by the Luni and its tributaries but not a single site of any phase of the Harappan culture has been found on any of them.

2. Similarly, Harappan sites (of all phases) are practically absent on the north Gujarat plain which is an extension of the west Rajasthan plain. This area receives an annual rainfall ranging from 400 mm in the west to 800 mm in the east and is drained by the Banas, the Sabarmati, the Mahi and their tributaries.

3. In sharp contrast to the total absence of Pre-Harappan and Harappan sites (of all phases) in these two areas is the great density of settlements of Pre-Harappan, Early Harappan, Mature Harappan, Late Harappan, and even later sites (P.G.W. and Medieval) in the Cholistan desert in Pakistan. This region has no active streams today. It receives less than 100 mm annual rainfall and is the most arid and inhospitable part of the Thar desert (Mughal 1981).

If increased rainfall was a causative factor in the emergence of agriculture, in the expansion of farming-based life, and in the development of Harappan culture, surely one would expect a greater density of Neolithic-Chalcolithic and Harappan sites in the relatively congenial west Rajasthan and north Gujarat plains than in the hyper-arid Cholistan. But the archaeological evidence is quite contrary to that expected by Singh's hypothesis. It can therefore be safely asserted that increased rainfall was not a decisive factor in the rise and growth of the Harappan culture.

4. The densest distribution of Harappan sites is not on the Indus river and its tributaries but on the extinct Hakra-Ghaggar and its equally extinct tributaries. Of the over 800 Harappan sites (not including Degenerate Harappan or OCP) known at present (Jansen 1980), more than 530 sites are located on the Hakra-Ghaggar system. If we add to this the nearly 200 Harappan sites from Kutch-Saurashtra and the nearly 70 Late Harapan sites from the Yamuna valley in Uttar Pradesh (U.P.), probably less than a hundred sites are left in the Indus valley proper and in Baluchistan.

The Harappan culture is, therefore, essentially a culture of the Hakra-Ghaggar valley, and any search for the cause or causes of the rise and fall of this culture must embrace an investigation into the fluctuations of the fortunes of this river as was rightly pointed out by Gupta (1978). Before doing this, however, it will be useful to have a look at the Harappan agricultural economy, for it may provide some clue to the pattern of Harap-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

pan colonization.

An examination of the limited data available for the Harappan agricultural economy (Vishnu-Mittre and Savithri 1979) shows the following crop pattern: wheat (*Triticum compactum* and *Triticum sphaerococcum*) in Pakistan Punjab (Harappa), Sind (Mohenjo-daro and Chanhu-daro) and Haryana (Banawali); barley (*Hordeum vulgare*) in Pakistan Punjab (Harappa) and north Rajasthan (Kalibangan); black gram (*Phaseolus mungo*) in north Rajasthan (Kalibangan)' peas (*Pisum arvense*) in Sind (Mohenjo-daro and Chanhu-daro), Punjab (Harappa) and north Rajasthan (Kalibangan); millet (*Eleusine corcana* and *Setaria italica*) in Kutch (Surkotada); and rice in Saurashtra (Rangpur and Lothal). It is thus seen that, except in Saurashtra and Kutch, Harappan agricultural economy was mainly based on wheat and associated winter crops. Today too, the same crops are grown in these areas, mainly with the help of artificial irrigation. However, the same crops can be and are grown without artificial irrigation in areas where annual monsoon floods provide adequate moisture and fresh fertile silt to the land. Since there is no evidence of artificial irrigation during Harappan times it follows that these crops were grown with the aid of moisture and silt provided by river floods.

It is significant that, in spite of a fairly similar annual rainfall pattern, Punjab, Haryana and the Indus valley are major wheat growing areas in the subcontinent while west Rajasthan and north Gujarat grow no wheat at all (except in pockets where artificial irrigation has been developed). The crucial difference between the two areas (wheat growing and non-wheat growing) is not rainfall but the availability of water from Himalayan rivers.

The different agricultural picture in Kutch and Saurashtra needs explanation. Kutch must have had adequate moisture for wheat and rice cultivation during Harappan times since, besides the Banas and the Luni, the Hakra was discharging into the Rann of Kutch. It is true that we have no evidence for the cultivation of these crops but that may be due to the accident of non-preservation of botanical material at excavated sites. The Harappan colonization of Saurashtra took place mainly during Late Harappan times through migration from the lower Indus valley (and probably also from Kutch) after the decline and abandonment of cities in the latter region. The immigrant population must have been forced to adapt its agricultural strategy to local environmental conditions by resorting to the cultivation of rice in river valleys and to dry farming of millets elsewhere.

It is, however, significant that, even during this critical period of large-scale migration from the Indus and Hakra valleys, the Harappans did not find the environmental conditions in west Rajasthan and north Gujarat sufficiently conducive for settling down.

It has been shown earlier that the largest concentration of Harappan sites of the three earlier phases is on the Hakra-Ghaggar river in the Cholistan desert (Pakistan) and on its tributaries in north Rajasthan, Haryana and Punjab (India). In comparison, the Indus valley, especially its upper course is very poor in Harappan sites (Fentress 1979). Today, the Hakra is a totally dead river. Its bed has been much encroached upon by sands, showing that the river has been extinct for a very long time. However, the bed of the river has been traced from its source in the Siwaliks through Punjab, Haryana, Rajasthan, Bahawalpur and Sind to its mouth in the Rann of Kutch with the help of surviving geomorphic traces and the presence of numerous archaeological sites along its course. Sir Aurel Stein (1942) discovered many archaeological sites along its course in the former Bikaner and Bahawalpur states. A. Ghosh (1952) traced a branch (Drishadvati) of this river in north Rajasthan and located many Harappan, P.G.W. and Rang Mahal culture sites along its course. Later, Henry Field (1959) continued the work of Stein in Bahawalpur and located more sites further east. More recently, Mughal (1981) has discovered nearly 400 sites of Pre-Harappan Hakra Ware, Early Harappan, Mature Harappan, Late Harappan (Cemetery 'H'-Related), Painted Grey Ware and Medieval period cultures on this river between the Indian border and south of Rahimyar Khan. On the lower course of the river, Louis Flam (1981) has located several Harappan sites. In the Indian part of this river in recent years a large number of Harappan and P.G.W. sites have been discovered on its various tributaries by Suraj Bhan (1971-72a, 1972, 1973, 1975), U.V. Singh (1977), Katy F. Dalal (*neè* Frenchman) (1972, 1981), and several officers of the Archaeological Survey of India (Bisht 1976, 1977;

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Dikshit 1979b, 1981; Joshi 1978a, 1978b; Joshi and Madhu Bala 1979; Lal 1977; Madhu Bala 1981; Thapar 1973a).

In its upper course, the bed of this river runs in a more or less east-west direction, up to the Indo-Pakistan border and is known variously as the Ghaggar (Ghosh 1952), Hakra and Sotra (Oldham 1893). From this point onward, it takes a south-westerly course into Bhawalpur and is known as the Hakra or Wahind. After entering Sind, it turns southward and flows in that direction right down to its mouth in the Rann of Kutch, and is known variously as the Narra (Nara), Hakra or Sagara, Wahind, and Dahan. For the greater part of its course, the bed of the Hakra runs parallel to, and east of, that of the Indus.

The width of the Hakra bed varies from 3 to 10 km in different parts of its course. It was obviously, therefore, a very large river during its lifetime. The large number of settlements found along its course dating broadly to the period 4000-600 B.C., also shows that it must have been a perennially flowing mighty river. Today no permanent settlement along its course is possible except where artificial irrigation has been provided. It is also significant that, except in the uppermost part, the river receives no feeders, and, therefore, the only source of its waters must have been the rainfall and snowmelt in the Himalayas. No amount of increased rainfall (as compared to today's) could have, however, filled such a wide and enormously long bed. Indeed, as Oldham (1893: 52) pointed out nearly a century ago,

> It would have involved the existence, previously, of such meteorological conditions as must have rendered the holy land of the Brahmanas an uninhabitable swamp. The neighbouring large rivers, too, must in such case have been vast in proportion. This, as their channels show, they were not. Some of them, in fact, which are mentioned in the Vedas as being fordable, are so with difficulty at the present day.

It is, therefore, clear that the Ghaggar-Hakra could have flowed as a mighty perennial river from its mouth to the sea only if some other equally large river was flowing in its channel in the past.

Hydrological Fluctuations: Yamuna and Sutlej

What was this river? And where did it go leaving the Hakra as a dry channel?

The question has attracted the attention of geographers, historians and archaeologists now for more than a century (Oldham 1874, 1883; R.D. Oldham 1886; Stein 1942; Ghosh 1952; Erikson 1959). The ancient river has been identified by most scholars with the Saraswati of Hindu tradition. Saraswati is one of the holiest rivers of the Hindus. According to living Hindu tradition, the river flows through a subterranean channel and joins the Yamuna at Prayag (Allahabad) to form, together with the Ganga, the Triveni Sangam (confluence of three holy rivers). This myth or legend would appear to enshrine the folk memory of a period when the Saraswati and the Yamuna did actually converge above ground. Subsequently, the Yamuna probably shifted its course leaving the Saraswati in possession of a dry channel, and helped create the myth of the river having gone underground. In the *Rig Veda,* the Saraswati is described as a large and rapid river flowing from the mountains to the sea. It is called 'the mother of rivers' and a river that 'surpasses in greatness all other waters' (Oldham 1893: 49). But in the *Mahabharata,* the river is described as having lost itself in the sands. Although it is not possible to assign precise dates to these events, most scholars put the beginning of the Vedic period around the middle of the second millennium B.C. The Mahabharata period has, on archaeological grounds, been shown to coincide with the P.G.W. culture (Lal 1954-55, 1981) which can be dated broadly to c. 1000-600 B.C. It can, therefore, be said that the Saraswati was a fully flowing river in the second millennium B.C. (and by implication earlier) but had dried up by c. 1000 B.C.

At present, the Saraswati is a small stream which originates in the Siwaliks a little to the west of the point where the Yamuna enters the plains. After flowing for nearly 150 km it joins the Ghaggar. Although below the confluence, the combined stream is shown on the maps as the Ghaggar, 'it was formerly the Saraswati; that name is still known amongst the people, and the famous fortress of Sarasuti or Saraswati was built upon its banks, nearly 100 miles below the present junction with the Ghaggar' (Oldham 1893: 51-52). This small Saraswati which carries water for only a short distance, still possesses the sacred character assigned to the river of that name since Rig Vedic times. There can, therefore, be little doubt that the existing Saraswati is the Saraswati of the Vedic and Epic periods. The names Ghaggar, Sotra, Hakra, Nara, etc. which the river carries in different parts

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of its course do not occur in ancient literature. They all seem to have been acquired in later historical or recent times.

What river did then flow into the Saraswati (or present day Hakra) channel to make it a functioning river, and when and how did it leave the Saraswati bed?

There are only two large rivers—the Sutlej and the Yamuna—which are close enough to the Saraswati to have performed this role. Between these two Himalayan rivers there is no other gap in the Siwaliks through which a third large river could have entered the plains and flowed into the Saraswati bed. It is also significant that there are no Harappan sites on the Sutlej except in its upper course near the Siwaliks. Nor are there any Harappan sites on the present Yamuna channel. It, therefore, seems certain that neither the Sutlej nor the Yamuna flowed in their present respective channels during Harappan times (3rd-2nd millennia B.C.). Both of them could, therefore, have flowed in the Saraswati channel. C.F. Oldham (1874, 1893), considered both these alternatives and came to the conclusion that the Sutlej rather than the Yamuna was flowing in the Saraswati channel. However, we have to remember that when Oldham wrote, he did not have, at his disposal, the enormous volume of archaeological evidence pertaining to Harappan and other cultures that has become available in last sixty years. His historical reasoning depended mainly upon the information available in Vedic and Epic literature and from the ruins of the antiquity of which he had no clear idea. The new

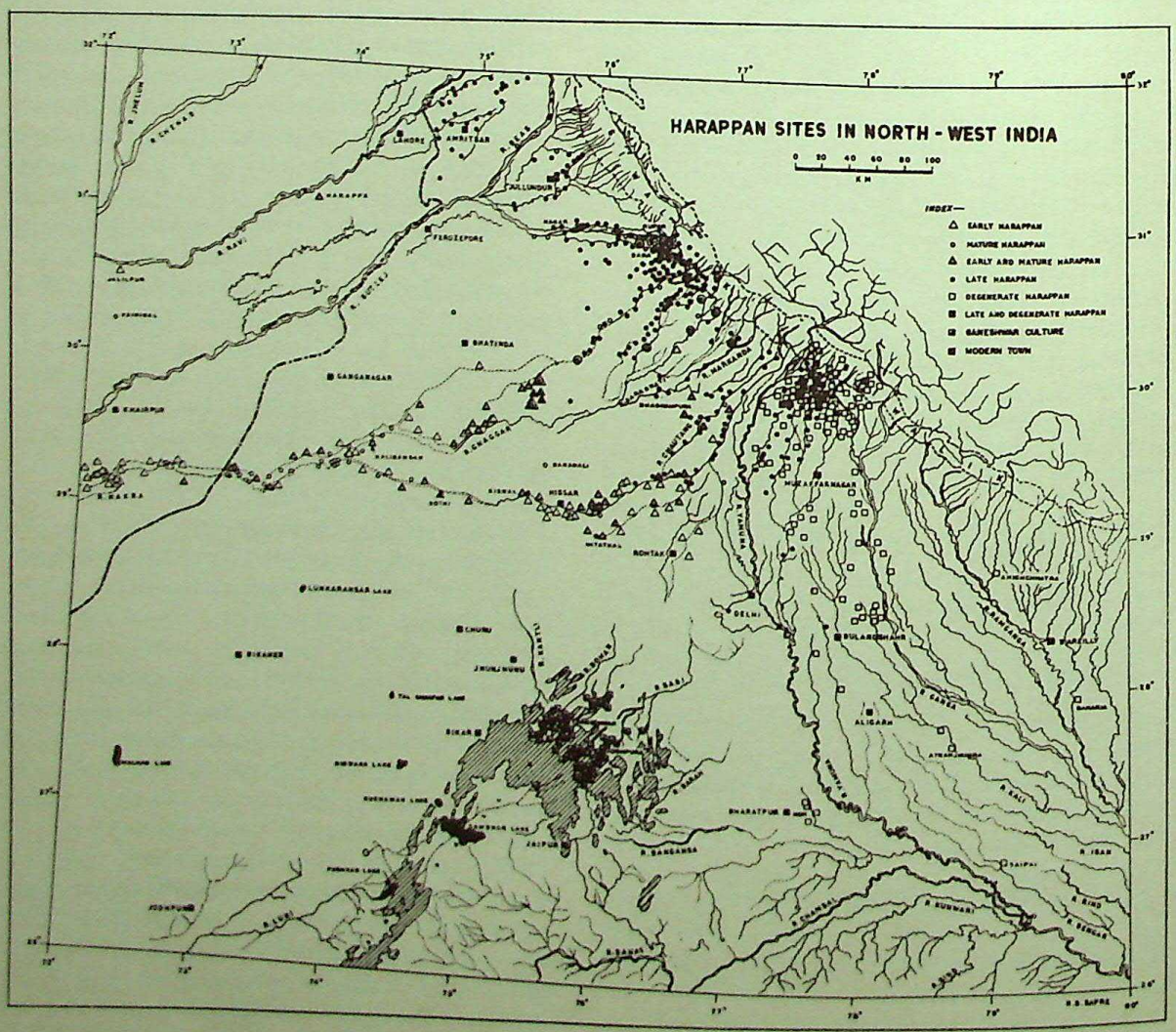


Fig.48.5. Map

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

archaeological evidence has made it possible to consider the question in a new perspective. Besides, recent research, specially by Raikes (1968) and Suraj Bhan (1972, 1973, 1975, 1977), has produced archaeological, geomorphic and sedimentological evidence to show that the Yamuna did flow into the Saraswati in the past. It has, therefore, become necessary to examine the alternatives in the light of this new cumulative evidence.

For such a re-examination, it is necessary to have a clear picture of the living and defunct river courses of the area in which the postulated vital changes in the course of the Sutlej and the Yamuna must have taken place.

There are a number of, mostly dry, river-beds between the Yamuna and the Sutlej in Haryana, Punjab and Rajasthan. They all rise within a very limited area on the western slopes of the Siwalik Range, bounded on the south by the drainage area of the Yamuna, and on the north by that of the Sutlej. None of them ever had any connection with the glaciers of the higher levels nor with other, larger, catchment areas. The upper courses of these rivers run through steep narrow gorges in the mountains, but below the 500 m level they broaden considerably and gradually peter out further westward where the head of water diminishes rapidly as the landscape levels out. Below the 250 m contour, the country is almost horizontal with only a slight westward cant. Here the width of these rivers varies from 2 to 10 km. They carry water, however, seasonally or throughout the year only in a narrow channel of the bed and only for short distances. Over most of their courses, the rivers meander through a flat, dry, hot and sterile desert. Because of its flat topography, the vast area covered by these rivers is, and has always been, susceptible to flooding by the waters of the Sutlej. This leads to the formation of vast lakes and their filling up by abundant silt and clay sediments brought in by the rivers. This process sometimes necessitated the scouring out of new courses by spring floods. This is the only way one can explain the presence of so many river courses in a very limited area with a limited supply of water. The lower courses of these rivers, already silted up, have been, and are being encroached upon by sands (Oldham 1893; Erikson 1959).

Because of the excessive silting and encroachment by sand of these river-beds, they are only discontinuously visible on the ground. For this reason, there are some discrepancies in the courses as traced by different scholars. All the courses may probably be visible on 1: 50,000 sheets, but this author has not had access to them. The map **(fig. 48. 5)** showing the river courses of the area has been drawn from 1.1,000,000 National Atlas sheets. It shows only some of the river-beds. C.F. Oldham (1893), however, has shown many more beds, specially between the Ghaggar and the Sutlej **(fig. 48.6)**. His map is probably based on the work of R.D. Oldham (1886). B.M. Pande (1977: fig. 2.21) has also shown the same rivers though his alignments differ slightly from those given by C.F. Oldham. The picture that emerges from a study of these maps as also from the accounts of Ghosh (1952), Erikson (1959) and Suraj Bhan (1972, 1973) can be summarized as follows:

The Ghaggar or Hakra is formed by a combination of two rivers which meet near Wallur (Oldham 1893: 57) or to the west of Anupgarh (Erikson 1959: 23) on the Indo-Pakistan border. These are named the eastern and western Hakra by Oldham, while Ghosh (1952) who explored the 'eastern Hakra' uses the name Ghaggar for it. The eastern arm of the Hakra is formed by a combination of four rivers which are named, from east to west: (1) Chautang (Chitrung of Oldham) or Drishadvati; (2) Saraswati; (3) Ghaggar; and (4) Wah or Sonamwal or Sirhind Nadi. The Chautang flows almost parallel and close to the Yamuna from the hills down to a little north of Karnal where the two rivers diverge, the Chautang taking a south-westerly course and the Yamuna turning south. At present, the Chautang dries up near the village of Safidom, but Ghosh (1952) was able to trace its course for a considerable distance further to the south-west, past the towns of Bhadra and Nohar to near Suratgarh where it must have joined the Ghaggar. The Hansi branch of the Western Yamuna Canal runs through this dry bed. Another river running west of, and parallel to it, is also known as Chautang (Erikson 1959: 22, fig. 3 and joins the Saraswati at the town of Pehowa. The Harappan site of Banawali is probably located on its dry bed. To its west is the Saraswati (also known as the Markanda in its upper course) which joins the Ghaggar near the village of Rasula, a few kilometers south-east of the small town of Shatrana. Although the Ghaggar is the smaller of the two

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

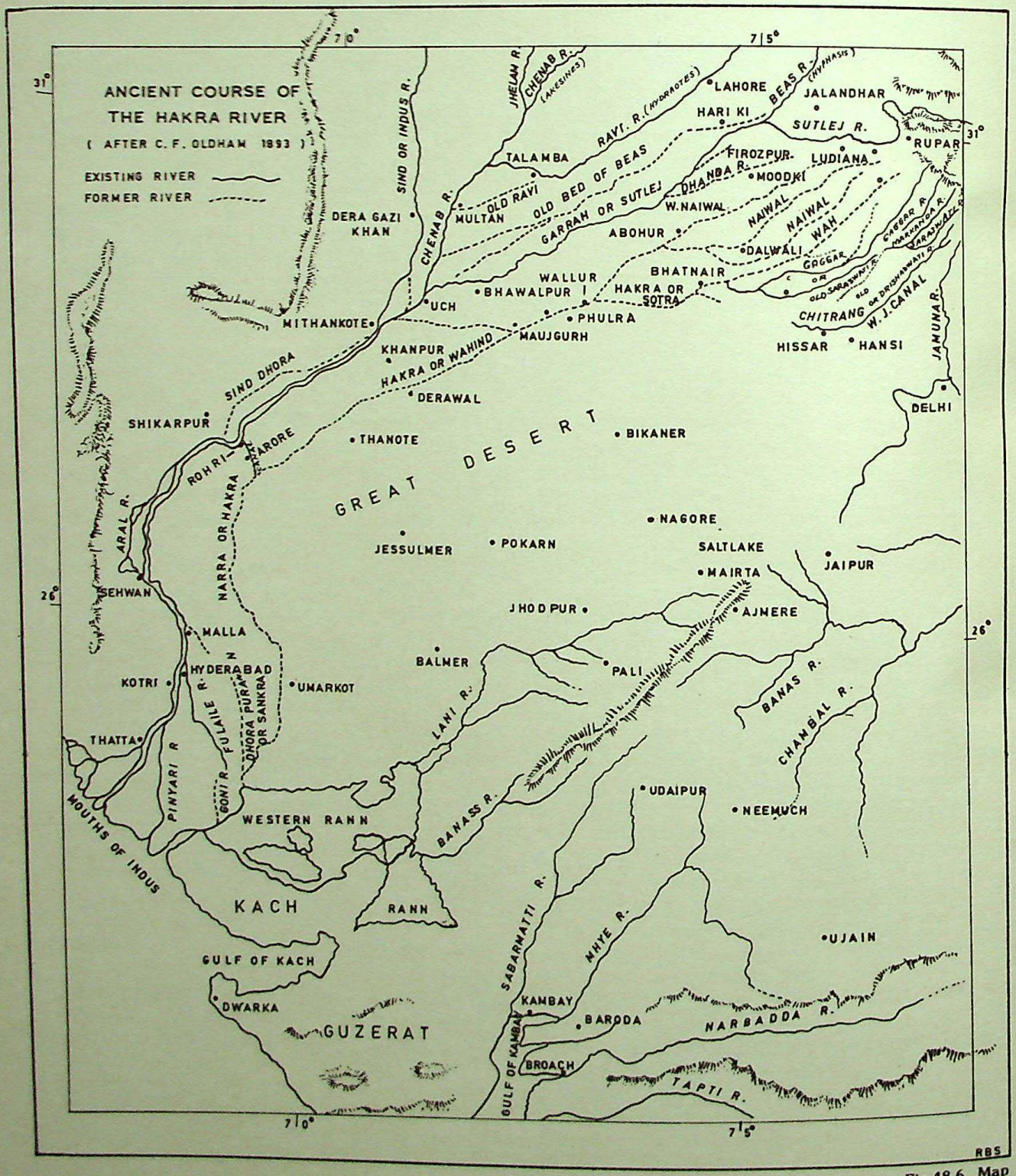


Fig.48.6. Map

rivers, from the confluence it takes the name of the combined river. Wah, the westernmost branch of the eastern arm of the Hakra, at one time joined the latter east of Sirsa, but today it

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

dries up nearly 100 km north-east of this town.

The western arm of the Hakra is formed by a combination of three rivers each of which is known as Naiwal. They are designated eastern, middle and western Naiwal. According to Oldham (1893: 58) these streams meet near Kurrulwala (29°33' N: 73°52' E) south of the town of Abohar in Punjab. In the map published by Pande (1977: **fig. 2.21**) the eastern and middle Naiwals are shown joining the Ghaggar south of Hanumangarh, as well as the western Naiwal a little further west. Between the western Naiwal and the Sutlej, Oldham has shown two more dry beds both of which join the Sutlej. The eastern of these beds is known as the Dhunda.

Oldham was of the opinion that the Sutlej flowed into the Hakra or Saraswati through each of these dry beds, gradually shifting its course from east to west. When the Sutlej shifted its course westward

> 'and abandoned the eastern arm of the Hakra, the Saraswati, which had been a tributary, was left in possesion of the deserted channel, in the sands of which its waters were swallowed up' (Oldham 1893: 59).

This event took place between the period of the *Rig Veda* and that of the *Mahabharata*. After this, the Sutlej flowed into the western arm of the Hakra through each of the three Naiwals, and finally changed its course more or less due west in the thirteenth cenutry A.D. to flow into the Beas valley through the two dry beds between the western Naiwal and the present Sutlej.

Oldham's arguments in support of his hypothesis are quite convincing, and can be summarised as follows.

1. The application of the name Sutlej to the combined Beas-Sutlej stream, below the confluence, is a modern innovation, and is not to be found in old writings, Hindu or Mohammedan. The united stream of Beas and Sutlej was never known as Satadru or Satludra. Instead it has been known as Vipasa, Beas and Beah. Even to this day, the river below Ferozepur is known to the boatmen as Beah or Garrah. All this seems to show pretty clearly that the Sutlej is an interloper, and the Beas the orginal stream. Had it been otherwise, the greater river must have retained its name throughout its course.

2. Several of the old river beds which combine to form the Hakra have been traced to within so short a distance of the Sutlej that they could not possibly have belonged to any other stream.

3. All the old channels of the Hakra diverge from the direction of Ropar where the Sutlej enters the plains and each is said to have been in turn the bed of that river. On the banks of each of them are towns which, though now more or less decayed, were once places of importance.

4. The local traditions of the land between the Sutlej and the Saraswati all agree that until Muslim times, the Sutlej flowed into the Hakra channel and that till then the country along its banks was fertile and prosperous.

5. There is a tradition that the Wah was once the old bed of the Sutlej.

Oldham's another inference that the Yamuna could not have flowed into the Saraswati bed is, however, not based on convincing arguments. In fact, he does admit that:

> It is not beyond the bounds of possibility that the Jumna may at some very remote period have taken a westerly instead of an easterly course and joined the Hakra; for, as observed by R.D. Oldham of the Indian Geological Survey, this old river-bed lies between the fan or talus of the Jumna, and that of the Sutlej (Oldham 1893: 55).

Elsewhere (*Ibid:* 58) he says:

> Near Bhatnair the eastern arm of the Hakra is joined by a dry river bed, marked in our maps as Chitrung. If the Jumna ever joined the Hakra it must have been by this channel, which however is only traceable for a short distance. It is supposed to have once been continuous with the Chitrung stream, which has been identified with the Drishadvati.

Yet, he is disinclined to accept this alternative because *'Tradition, however, is silent on the subject, and so are the Vedas' (Ibid:* 55).

What Oldham means by tradition in this context is not very clear, for as has been mentioned earlier and is indeed too well known, Hindu tradition strongly associates the Saraswati with the Yamuna but never with the Sutlej. How a percipient scholar like Oldham could be unaware of this is difficult to comprehend.

Oldham's view in this matter is mainly influenced by the references to Yamuna in the Vedic and Epic literature, namely:

(i) In the only place in which the river Ganga is mentioned in the *Rig Veda* (X. 75.5) the Yamuna is coupled with it; and

(ii) There is ample evidence from the *Mahabharata* and the *Ramayana* to show that the Yamuna was flowing in its present channel during the period of these epics.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

In other words, since literary tradition says that the Yamuna was flowing in its present course, it could not have flowed elsewhere.

Here it is important to remember that Oldham was writing at a time when the history of India was not known to extend beyond the period of the Epics and the Vedas. With our present archaeological knowledge, however, we know that there is no contradiction in the Yamuna having flowed during the Epic and probably even during the Early Vedic time in its present course, and during pre-Vedic or Harappan times in a different course.

The available archaeological evidence suggests that this indeed was the case:

(1) The total absence of Harappan sites along the present course of the Yamuna shows that the river was not flowing in its present course during the Harappan period.

(2) The presence of many Painted Grey Ware (P.G.W.) sites on the Yamuna shows that the river had shifted to its present channel by P.G.W. time. The association of the P.G.W. culture with the *Mahabharata* epic has been fairly convincingly demonstrated (Lal 1954-55, 1981).

(3) Raikes (1968) has shown, on geomorphic and sedimentological evidence that the Yamuna was actually flowing in the Ghaggar channel during Harappan times. The geomorphic evidence consists of the migration of the meandering channel of the Yamuna across the 10-15 km width of the plain. To the west, the plain slopes gently towards the Indus. The present Western Yamuna Canal evidently incorporates considerable parts of a former channel that followed the extreme western boundary of the plain. The sedimentological evidence consists of the discovery of

> 'a coarse, greyish sand very similar in mineral content to that found in the bed of the present-day Yamuna'

in bore holes in the Ghaggar bed at Kalibangan 11 m below the present flood plain level (Raikes 1968: 287). Above the 11 m depth, Raikes found mainly clays and silts typical of present-day flood-plain deposits. Basing his arguments on calculations for the rates of sedimentation, location of archaeological sites of early cultures (Harappan, P.G.Ware and Rang Mahal or Kushan) in the Ghaggar valley, and the thickness of the deposits at these sites, Raikes has postulated alternate captures of the Ghaggar channel by the Indus and the Ganga systems. In effect, these episodes imply simply the capture or abandonment of the Ghaggar channel by the Yamuna. Raikes has correlated these episodes with archaeological cultures in the following manner:

1.	Westward diversion to Indus (coinciding with Harappan occupation)	2500-1750 B.C. (750 years)
2.	Eastward diversion to Ganga (coinciding with abandonment)	1750-1100 B.C. (650 years)
3.	Westward diversion to Indus (coinciding with Painted Grey Ware)	1100-500 B.C. (600 years)
4.	Eastward diversion to Ganga (coinciding with abandonment)	500-100 B.C. (400 years)
5.	Westward diversion to Indus (coinciding with Early Historic)	100 B.C.-A.D. 500 (600 years)
6.	Eastward diversion to Ganga in about A.D. 500 (coinciding with abandonment)	

Raikes' second and third westward diversions take into consideration only the archaeology of the Ghaggar valley and totally ignore the archaeological and historical evidence of the Yamuna valley. They appear to be forced upon to explain the presence of Painted Grey Ware and Rang Mahal cultures on the Ghaggar. However, basing on the total archaeological evidence both on the Ghaggar and the Yamuna, there seems little doubt that, during Harappan times, the Yamuna was flowing in the Ghaggar channel, and subsequently, it has always flowed in its present channel.

The question then arises as to through which of the many existing and obsolete channels of the Ghaggar did the Yamuna flow into the Ghaggar (or Saraswati). From the archaeological point of view, the most important of these channels appears to be the Chautang or the Drishadvati since a large number of Early and Mature Harappan sites have been located on it. Though today the Chautang dries up east of Safidom, Ghosh (1952) was able to trace its course right up to the Ghaggar near Suratgarh. As suggested by Oldham also, Yamuna is most likely to have flowed through this channel during its westward course in prehistoric times.

The eastward shift of the Yamuna must have taken place through the channels which have recently been traced by Suraj Bhan (1972). One of these starts from near Indri, 20 km north of Karnal and is traceable for a distance of 180 km up to Tigrana near Tosam in the south-west. This

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

channel runs along the course of the West Yamuna Canal up to Mundak and then along the Jind branch of the same canal up to Safidom. The channel is marked by sand dunes along its banks, a regular band of fresh water vegetation in its course and thick deposits of the grey sands so typical of the Yamuna,in the wells dug along the channel. Local tradition also associates this channel with the old course of the Yamuna. East of Tigrana, the channel is lost in the sands. Suraj Bhan has located 18 Harappan and 2 P.G.W. sites on this channel. The scarcity of P.G.W. sites here suggests that the Yamuna had already shifted eastward during the Late Harappan period. Suraj Bhan has located two more channels further east with late Harappan and P.G.W. sites on them, thus providing further evidence for the eastward shift of the Yamuna. This eastward diversion of the Yamuna to its present channel and the westward diversion of the Sutlej into the western arm of the Hakra, sometime in the Late Harappan times, must have left the channel of the Ghaggar (Saraswati) dry over a long distance (up to Wallur where the western arm of the Hakra joined it). This must have created the myth that Saraswati went underground to join the Yamuna.

Decline Of Indus Civilization — Fresh Look

The third hypothesis of Singh's, namely, that a decrease in rainfall around 1800 B.C. led to a decline of the Indus Civilization can now be examined.

Here it may incidentally be mentioned that the date of the decline in rainfall is not certain. While at Lunkaransar in the arid belt,the lake had started drying up around 2000 B.C., the same event at Sambhar, in the semi-arid belt, took place a thousand years later. It is difficult to explain such a long time difference between two points only 200 km apart. Singh's dating of this event therefore seems to be influenced by the need of reconciling the climatic evidence with archaeological data.

But first let us examine the evidence for the decline of the Indus Civilization.

It is undeniable that in the 18th-19th centuries B.C., Harappan cities declined, and some of them were even abandoned. In the lower Indus valley many causes for this event have been suggested: reduction in rainfall (Marshall 1931); exhaustion of the economic resources (Wheeler 1968; Fairservis 1961, 1967); excessive flooding (Raikes 1964, Dales 1966); and Aryan invasion (Wheeler 1953). Though some of these explanations have been questioned (Dales 1964, 1966; Possehl 1967; Lambrick 1967), the fact of decline and abandonment of the cities is accepted by all critics. There is also an undeniable decline in material prosperity and in civic standards. But this decline did not lead to a decrease in population. It only forced the population to migrate from the lower Indus valley into Saurashtra and from the Hakra-Ghaggar valley into north Punjab, Haryana and the upper Yamuna-Ganga doab. The sudden proliferation of Late Harapan sites in Saurashtra, north-east Punjab and Haryana and the upper Yamuna-Ganga doab attests to this migration.

At least in the case of north Punjab and the upper Yamuna-Ganga doab, rainfall is not significantly higher than in the adjoining parts of Punjab and Haryana which had witnessed dense human settlements during the Early and mature Harappan times. Therefore, these new regions of colonization could not have conferred any significant advantages to the immigrants. On the other hand, the shift of the courses of the Yamuna and Sutlej to the east and west, respectively, would have considerably reduced the availability of both surface and sub-surface water in the Ghaggar valley. This would, in due course, have adversely affected both natural vegetation and agriculture, and forced the population to shift to areas like north Punjab (Sutlej channel) and the upper Yamuna-Ganga doab where the rivers provided the ecological conditions the Harappan had long been accustomed to exploit. It is, therefore, quite unnecessary to invoke the deterioration of climate to explain this migratory phenomenon.

In the case of the lower Indus valley, some or all of the various explanations suggested, could have accounted for the shift of the Harappan population into Gujarat.

The phenomenon of Degenerate Harappan (same as OCP or OCW) culture represents a continuation of the eastward migration of the Late Harappans. This would appear to be due to excessive population pressure in the limited land available in the upper doab. The density of Late Harappan sites in the districts of Ludhiana and Saharanpur is eloquent proof of this demographic pressure.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ARIDITY: SECOND MILLENNIUM — FRESH LOOK

The fourth and final hypothesis of Singh is that aridity between 2000 and 1000 B.C. is responsible for the 'hiatus' between the Harappan and P.G.W. cultures. This too does not stand the scrutiny of new archaeological evidence. Recent excavations by the Archaeological Survey at Bhagwanpura, in the district of Kurukshetra (Haryana); Dadheri in the district of Ludhiana, Nagar and Katpalon,both in the district of Jullandur (Punjab), and Manda on the Chenab in Jammu have shown that the P.G.W. culture co-existed with the Late Harappan at these sites (Joshi 1977, 1978; Lal 1979). Gupta (Gupta and Ramachandran 1977) suggests 1300 B.C. for this overlap phase. This new evidence eliminates the 'hiatus' between the Harappan and P.G.W. cultures and effectively knocks the bottom out of the desiccation hypothesis of Singh. Even in the north Rajasthan part of the Ghaggar valley, the new evidence available suggests that there was no 'hiatus' between the Harappan and the P.G.W. cultures. Black-and-red Ware has been found in profuse quantities in association with Painted Grey Ware both in surface explorations and in the excavation at Sardargarh in this region (Pande 1977: 56). Archaeological research during last two decades has amply demonstrated that in north-east Rajasthan (Jodhpura and Noh) and in the central Yamuna-Ganga doab (Atranjikhera), Painted Grey Ware was preceded by an independent phase of Black-and-red Ware culture which, in turn at many sites, was preceded by OCP or Degenerate Harappan. Fresh field research in Ghaggar valley in Rajasthan and a re-evaluatioin of the older evidence is most likely to show a continuity of occupation in this area from Harappan to Painted Grey Ware.

However, there is evidence to show that population during the Painted Grey Ware period was much sparser in the Ghaggar valley. In the Pakistan part of the this valley, only 14 sites of this culture have been found and all these occur in the eastern part (south-east of Bahawalpur) near the Indian border. This is in sharp contrast to the dense concentration of Mature Harappan sites further down in the same valley (south-west of Bahawalpur) (Mughal 1981: map). Further, Ghosh (1952) has shown that the Painted Grey Ware sites are often located on the Ghaggar bed. These two factors show that during the P.G.W. period: (*i*) the Ghaggar (or Saraswati) no longer flowed all the way to the sea, but only in the upper part of its course; and (*ii*) that its original bed had considerably shrunk. This must naturally have been the consequence of the diversion of the Yamuna from the Ghaggar channel to its own present channel.

SUMMING UP

We can now summarize the conclusions of this lengthy review of archaeological and palaeo-environmental evidence as follows:

(1) The sedimentological evidence from the *playas*, the stabilization of extensive sand dunes formed during the arid Upper Pleistocene, and widespread appearance of microlith-using and hunting-gathering-pastoral populations in West Rajasthan supports Gurdip Singh's hypothesis based on palynological evidence that rainfall had increased in early Holocene times.

(2) The complete absence of farming-based sites earlier than 2000 B.P. in western Rajasthan (the area of the lakes that produced the climatic sequence) and on the north Gujarat plain does not support the hypothesis that cereal agriculture had appeared in this region as early as 7000 B.C.

(3) Harappan sites are totally absent in western Rajasthan except on the Ghaggar river in the north-western corner of this state. Similarly, such sites are missing on the north Gujarat plain drained by the Mahi and the Sabarmati rivers. Both these areas are agriculturally very fertile provided necessary moisture for crops is available. The failure of the Harappans to colonize these extensive alluvial plains shows that the increase in rainfall postulated by Singh around 3000 B.C. was not strong enough to make these areas cultivable.

(4) The Ghaggar river originates in the Himalayas and its channel passes through Punjab, Haryana, Rajasthan, Bahawalpur and Sind to its mouth in the Rann of Kutch. It should therefore be possible to explain the presence of Harappan sites on this river in the north-east corner of Rajasthan by factors which are also applicable to other sites on the rest of the course of this river.

(5) The geographical distribution of the Harappan sites reveals the following pattern: most of the Early Harappan sites are located in the middle Ghaggar-Hakra valley and a few in the lower and upper Indus valley. The Mature

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Harappan sites occur on the Indus, in Kutch-Saurashtra, and on the Ghaggar, but the greatest concentration is again in the middle Ghaggar-Hakra valley. In Late Harappan times, there is a decline in the number of sites in the middle Hakra valley (Cemetery 'H'-related) and in the Indus valley (Jhukar culture), but there is a remarkable expansion of settlements in Saurashtra and in the upper Ghaggar-Sutlej valleys. The Harappans also cross the Indus system to colonize the upper Yamuna-Ganga doab during this period. The Degenerate Harappan (OCP) sites are mainly located in the upper Yamuna-Ganga doab but there is also a sporadic expansion in the central doab and even further east.

(6) This pattern of settlements shows that, except in Saurashtra, Harappan culture was essentially a riverine culture, flourishing in the valleys of the Himalayan rivers whose flood plains are annually inundated by monsoon floods which spread fresh fertile silt and provide adequate subsoil moisture for agricultural crops.

(7) The Harappan agricultural economy was mainly based on the cultivation of wheat, barley, gram and peas which are winter crops and can be grown in the flood plains of large, annually inundated rivers without artificial irrigation. This pattern of agriculture could have been practised in the river valleys existing in the Harappan zone in the present climatic conditions. Higher rainfall during Harappan times was not necessary for the flourishing of this economic pattern in these river valleys.

(8) The Ghaggar-Hakra today is a dead river, except near its source in the Siwaliks. But during the time of the *Rig Veda* (middle of second millennium B.C.) it was a mighty river and was flowing from the mountains to the sea. Its very wide bed (up to 10 km) also shows it to have been a mighty river like the Indus. This bed can be traced right from its source in the Siwaliks through Punjab, Haryana, north-east Rajasthan, Bahawalpur and Sind to its mouth in the Rann of Kutch. The river could have supported the large populations represented by the dense concentration of Hakra Ware, Early Harappan, Mature Harappan and Late Harappan (Cemetery 'H'-related) sites only if it was perennially flowing with the volume of water commensurate with the width of its bed.

(9) No amount of reasonably possible higher rainfall in the Himalayas could have filled this bed, unless one or more of the large Himalayan rivers flowed through its channel. For geomorphic considerations, this function could have been performed only by the Sutlej and the Yamuna.

(10) The absence of Harappan sites on the Sutlej (except in its uppermost course along the Siwaliks) and on the Yamuna shows that these rivers were not flowing in their present channels during Harappan times. Indeed, the Sutlej was not flowing in its present course until the late medieval period. There is geomorphic, archaeological and folkloristic evidence to show that both the Sutlej and the Yamuna were flowing into the Ghaggar channel in the past, and that they shifted to their present channels during early medieval times and Late Harappan times, respectively.

(11) The shifting of the Yamuna from its ancient course must have considerably reduced the volume of water in the Ghaggar bed. This would have reduced the extent of annual flooding and consequently the potential for agriculture along the Ghaggar course. The Harappan population must, therefore, have been forced to move eastwards along the course of the perennial rivers and into areas with more assured rainfall. The sudden proliferation of Late Harappan settlements in the upper reaches of the Sutlej and of the Ghaggar tributaries, and in the upper Yamuna-Ganga doab is symptomatic of this hydrological change.

(12) There is definite evidence for the decline of the Mature Harappan culture and the abandonment of the cities in the Indus valley. These phenomena have been explained as due to the depletion of ecological resources caused by over-exploitation, sapping of the population morale due to recurrent and disastrous flooding (caused perhaps by the damming of the Indus by tectonic uplift), and tribal movements. The population from this region spilled over into Kutch and Saurashtra as is seen by the dramatic increase in Late Harappan settlements in these areas. The Harappans here adapted their agricultural strategy by taking recourse to the cultivation of rice (in the Hakra delta and along river valleys) and the dry farming of millet crops.

(13) The 'hiatus' between the Harappan and P.G.W. cultures has been bridged by recent researches in Haryana, Punjab and Jammu. The postulated decline in rainfall between the Harap-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

pan and P.G.W. periods can, therefore, no longer be sustained by archaeological evidence. The smaller number of P.G.W. sites (as compared to Harappan) in the Hakra valley is easily explained due to the reduced volume of water in its bed caused by the shifting of the Yamuna from the Ghaggar to its present channel.

In sum, the enormous volume of archaeological evidence now available from north-west India completely fails to sustain the overall hypothesis proposed by Gurdip Singh that fluctuations in rainfall played a decisive role in the emergence, diffusion, prosperity and decline of farming-based cultures in the region. The only role the increased rainfall played was to arrest the hyper-aridity of the Upper Pleistocene, stabilize the sand dunes, accelerate the growth of vegetation and help in the emergence and spread of a nomadic hunting-gathering-pastoral economy. This pattern of life has persisted in the semi-arid and arid environments to this day. Agriculture based on dry farming of millet and related crops appeared in these regions only during the past 2000 years and was probably a consequence of the increasing population pressure in neighbouring areas. With the appearance of agriculture and permanent habitation, overall vegetation density and cover as also wild fauna was reduced, leading to a decline in the role of hunting in the economy. Pastoralism, however, proved to be the best adaptive strategy and has persisted to this day.

NOTES

1. Since 1977, this writer is directing a multi-disciplinary research project on 'Early Man and his Environment in North-West India'. Other members taking part in this project are S.N. Rajaguru (Deccan College, Pune), D.P. Agrawal (Physical Research Laboratory, Ahmedabad), R.P. Dhir (Central Arid Zone Research Insitute, Jodhpur), and R.J. Wasson and Gurdip Singh of the Australian National University, Canberra. Besides conducting extensive explorations in western Rajasthan and excavation at Jayal and Didwana, in the district of Nagaur, the research team has examined the stratigraphy of all the major salt lakes of Rajasthan. In January 1980, largely on the initiative of Wasson and Singh, we dug two wells in the Didwana lake to collect fresh samples for palynological, sedimentological and radio-carbon analysis. The palynological data is being analysed by Gurdip Singh, sedimentological by Wasson and Rajaguru, and radiocarbon samples by Agrawal. Preliminary results of these studies show that the lake had already started carrying water in the oterminal Pleistocene.

2. The term 'Pre-Harappan' is here used for Neolithic-Chalcolithic cultures antedating Kalibangan I, Kot Dijian and Amarian cultures for which this term has traditionally been used in archaeological literature. For these latter cultures, I have used, following R.M. Mughal, the term 'Early Harappan'.

3. A comprehensive and up-to-date map of Harappan sites is an essential prerequisite for an understanding of the geographical distribution of Harappan culture. Unfortunately, no such map exists. Maps presently available of the entire Harappan zone (Mughal 1973a; Thapar 1981) or parts of its (Madhu Bala 1978; Suraj Bhan 1972, 1973; *I.A.R.* 1976-77, **fig. 3**) are highly unsatisfactory because of their incompleteness, very small size and poor quality printing, the last often rendering them illegible. Jansen (1980) has done a commendable job in listing 331 sites, most of them with their geocoordinates and dimensions, but the map published by him suffers from most of the defects noted earlier about other maps. For these reasons I had intended preparing a large and comprehensive map of the entire Harappan region, but unfortunately, this could not be possible because of the constraint of time. I have, therefore, prepared two maps: One, a small and general map, showing the total area of Harappan culture and relative regional density of sites **(fig. 48.4)**, and the other a larger and more comprehensive map of Harappan sites in Rajasthan, Punjab, Haryana and Uttar Pradesh **(fig. 48.5)**. Even in the latter map it has not been possible to show all the sites in the upper Yamuna-Ganga doab because of the constraint of space. Due to deficiencies inherent in the published site data, the larger map cannot be totally accurate, but it does succeed in giving us a reasonably clear picture of the distribution pattern of Harappan sites in north-west India.

ACKNOWLEDGEMENTS

Makkhan Lal, my research student, kindly prepared a tracing of the base map of Harappan sites in north-west India **(fig. 48.5)** from National Atlas sheets and plotted the sites under my supervision. R.B. Sapre prepared the final copy. Sapre

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

also made the final copies of the maps in **figs. 48.4, 6,** originally drawn by P.R. Kulkarni. Kulkarni has drawn the other three maps **(fig. 48. 1-3)**.

To all these gentlemen I record my grateful thanks for their valuable help.

REFERENCES

Agrawal, D.P.; Datta, P.S., Husain, Z.; Krishnamurty, R.V.; Misra, V.N.; Rajaguru, S.N.; and Thomas, P.K. 1980a. *Palaeoclimate, Stratigraphy and Prehistory in North and West Rajasthan. Proceedings of the Indian Academy of Sciences* (Earth Planetary Science), 89 (1); 51-66.

Agrawal, D.P.; Krishnamurty, R.V.; Dhir, R.P.; Misra V.N. and Rajaguru, S.N. 1980b. Quaternary Studies in Rajasthan: Preliminary Results. *Recent Researches in Geology.* 9; 186-199.

Agarwala, R.C. 1978. Copper Celts and an Indus Arrow-Heads from Kulhade-ka-Johad, District Sikar, Rajasthan. *Man and Environment.* 2; 123-24.

———. 1980. Khuradi (?) Copper Hoard from Rajasthan. *Man and Environment.* 4; 89-91.

———. 1981. Recent Explorations in Rajasthan. *Man and Environment.* 5: 59-63.

Allchin, B. and Goudie, A. 1971. Dunes, Aridity and Early Man in Gujarat, Western India. *Man.* 6, (2); 248-265.

———. 1978. Climatic Change in the Indian Desert and North-West India during the Late Pleistocence and Early Holocene. In *The Environmental History of the Near and Middle East.* William C. Brace ed. 307-318. London: Academic Press.

Allchin, B.; Goudie, A. and Hegde, K. 1978. *The Prehistory and Palaeogeography of the Great Indian Desert.* London: Academic Press.

Bisht, R.S. 1976. Transformation of the Harappa Culture in Punjab with special reference to the excavations at Sanghol and Chandigarh. In *Archaeological Congress and Seminar.* U.V. Singh ed. 16-22. Kurukshetra: Kurukshetra University.

———. 1977. *Banawali: A Look Back into the Pre-Indus and Indus Civilization.* 1-14. Chandigarh: Government of Haryana.

Braidwood, R.J. 1961. Levels in Prehistory: A Model for the Consideration of the Evidence. In *Evolution after Darwin.* Sol Tax ed. Vol. 2. pp. 143-151 Chicago: Chicago University.

Casal, J.M. 1964. *Fouilles d'Amri.* Paris: Commission des Fouilles Archaeologiques.

Dalal, Katy F. 1980. A Short History of Archaeological Explorations in Bikaner and Bahawalpur along the 'lost' Saraswati River. *Indica,* 17 (1); 1-40.

———. 1981. RD-89 A New Hakra Ware Site. *Man and Environment.* 5; 77-86.

Dales, G.F. 1964. The Mythical Massacre at Mohenjo-daro. *Expedition.* 6 (3); 36-43.

———. 1965. New Investigations at Moherjo-daro. *Archaeology.* 18 (2); 145-150.

———. 1966. The Decline of the Harappans. *Scientific American.* 241 (5); 92-100.

———. 1981. Reflections on Four Years of Excavations at Balakot. In *Indus Civilization: New Perspectives.* A.H. Dani. ed. 25-32. Islamabad: Quaid-i-Azam University.

Dani, A.H. 1970-71. Excavations in the Gomal Valley. *Ancient Pakistan.* 5; 1-177.

———. 1975. Origins of Bronze Age Cultures in the Indus Basin—a Geographic Perspective. *Expedition.* 17 (2); 12-18.

Deshpande, M.N. 1977. The Harappan Settlements in the Ganga-Yamuna Doab. In the Seminar on *Indus Civilizations: Problems and Issues.* Simla: IIAS

Dikshit, K.N. 1979a. The Ochre Coloured Ware Settlement in the Ganga-Yamuna Doab. In *Essays in Indian Protohistory.* D.P. Agrawal and D.K. Chakrabarti ed. 285-299. Delhi: B.R. Pub. Corp.

———. 1979b. The Late Harappan Culture in India. In *Essays in Indian Protohistory.* D.P. Agrawal and D.K. Chakrabarti ed. 123-133. Delhi: B.R. Pub. Corp.

———. 1979c. Hulas and the Late Harappan Complex in Western U.P. In the Conference on *The Harappan Civilization: A Contemporary Perspective.* Srinagar: AIIS

———. 1980. A Critical Review of the Pre-Harappan Cultures. *Man and Environment.* 4; 32-43.

———. 1981. The Excavations at Hulas and Further Exploration of the Upper Ganga-Yamuna Doab. *Man and Environment* 5; 70-76.

Durrani, F.A. 1965. Climate of the Lower Indus Valley in Ancient Times. *Journal of the University of Peshawar.* 10; 33-37.

Erikson, K. Gosta. 1959 The Dry Bed of the River Ghaggar. In *Rang Mahal.* Hanna Rydh. 22-40. Lund (Sweden): C.W.K. Gleerup.

Fairservis, Jr. W.A. 1961. The Harappan Civilization: New Evidence and More Theory. *Novitates.* 2055; 1-35. New York: American Museum of Natural History.

———. 1967. The Origin, Character and Decline of an Early Civilization. *Novitates.* 2302; 1-48. New York: American Museum of Natural History.

———. 1979. Allahdino: Excavation of a small Harappan site. In the Conference on *The Harappan Civilization: A Contemporary Perspective.* Srinagar: AIIS.

Fentress, Marcia A. 1979. From Jhelum to Yamuna—City and Settlement in the 2nd-3rd Millennium B.C. In the Conference on *The Harappan Civilization: A Contemporary Perspective.* Srinagar: AIIS.

Field, Henry. 1959. An Anthropological Reconnais-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

sance in West Pakistan. *Papers of the Peabody Museum of Archaeology and Ethnology*. Harvard University. Vol.3 Cambridge (Mass): Peabody Museum.

Flam, Louis. 1976. Settlement, Subsistence and Population: A Dynamic Approach to the Development of the Indus Valley Civilization. In *Ecological Backgrounds of South Asian Prehistory*. K.A.R. Kennedy and G.L. Possehl eds. 76-93. Cornell: Cornell University.

———. 1981. Towards an Ecological Analysis of Prehistoric Settlement Pattern in Sind, Pakistan. *Man and Environment*. 5; 52-58.

Frenchman, Katy F. 1972. Prehistoric Pottery Industries along the 'Lost' Saraswati River of the Great Indian Desert. Unpublished Ph.D Thesis. Pune: Poona University.

Gaur, R.C. 1971-72. O C P and N B P. *Puratattva*. 5; 10-12.

———. 1973. Lal Qila Excavation and the O.C.P. Problem. In *Radiocarbon and Indian Archaeology*. D.P. Agarwal and A. Ghosh ed. 154-162. Bombay: T.I.F.R.

Ghose, B.; Kar, A. and Husain, Z. 1979. The Lost Courses of the Saraswati River in the Great Indian Desert: New Evidence from Landsat Imagery. *The Geographical Journal*. 145 (3); 446-451.

———. 1980. Comparative Role of the Aravalli and the Himalayan River Systems in the Fluvial Sedimentation of the Rajasthan Desert. *Man and Environment*. 4; 8-12.

Ghosh, A. 1952. The Rajputana Desert — its Archaeological Aspect. *Bulletin of the National Institute of Sciences of India*. 1; 37-42.

———. 1965. The Indus Civilization: Its Origins, Authors, Extent and Chronology. In *Indian Prehistory. 1964*. V.N. Misra and M.S. Mate eds. 112-156. Poona: Deccan College.

1979. De-Urbanisation of the Harappa Civilization. In the Conference on *The Harappan Civilization: A Contemporary Perspective*. Srinagar: AIIS.

Goudie, A.S., Allchin B. and Hegde, K.T.M. 1973. The Former Extensions of the Great Indian Sand Desert. *The Geographical Journal*. 139 (2); 243-257.

Gupta, S.P. 1971-72. OCP and NBP: 1971. *Puratattva*. 5; 7-8.

———. 1978. Origin of the Form of Harappa Culture: A new Proposition, *Puratattva*. No.8 (1975-76) 141-46.

———. 1979. The Late Harappa: A Study in Cultural Dynamics. In the Conference on *The Harappan Civilization: A Contemporary Perspective*. Srinagar: AIIS.

Gupta, S.P. and Ramachandran, K.S. 1977 *Mahabharat: Myth and Reality*, Agam Prakashan, New Delhi. Introduction, pt.II, by Gupta.

Indian Archaeology — A Review (I.A.R.) Annual Publication of the Archaeological Survey of India since 1954. New Delhi.

Jansen, M. 1980. Settlement Patterns in the Harappa Culture. In *South Asian Archaeology*. H. Hartel ed. 251-269. Berlin: Dietrich Reimer Verlag.

Jarriage, J.F. 1929. Excavations at Mehrgarh (Baluchistan): Their Significance for Understanding the Background of the Indus civilization. In the conference on *The Harappan Civilization:* A contemporary *Perspective*. Srinagar: AIIS.

Jarrige, J.F. and Enault, J.F. 1973. Recent Excavations (French) in Pakistan. In *Radiocarbon and Indian Archaeology*. D.P. Agrawal and A. Ghosh eds. 163-172. Bombay: TIFR.

Jarrige, J.F. and Lechevallier, M. 1979. Excavations at Mehrgarh, Baluchistan: Their Significance in the Prehistorical Context of the Indo-Pakistani Borderlands. *South Asian Archaeology* 1977. 463-535. Naples.

Joshi, J.P. 1972a. Exploration in Kutch and Excavation at Surkotada. *Journal of the Oriental Institute*. 22 (1-2); 98-144.

———. 1972b. Fresh Light on the Archaeology of Kutch. In *Archaeological Congress and Seminar Papers*. S.B. Deo ed. 21-35. Nagpur: Nagpur University.

———. 1974. Surkotada: a Chronological Assessment. *Puratattva*. 7; 34-38.

———. 1978a. Overlap of the Late Harappan Culture and Painted Grey Ware Culture in the Light of Recent Excavations in Haryana, Punjab and Jammu. In the Seminar on *Indus Civilization: Problems and Issues*. Simla: IIAS.

———. 1978b. Interlocking of Late Harappa Culture and Painted Grey Ware Culture in the Light of Recent Excavations. *Man and Environment*. 2; 98-101.

———. 1981. Movement of Harappans in Circa Third and Second Millennium B.C. *Man and Environment*. 5: 64-66.

Joshi, J.P. and Madhu Bala. 1979. Manda — A Harappan Site in Jammu and Kashmir. In the Conference on *The Harappan Civilization: A Contemporary Perspective*. Srinagar: AIIS.

Khan, F.A. 1965. Excavations at Kot Diji. *Pakistan Archaeology*. 2; 1-85.

Lal, B.B. 1954-55. Excavations at Hastinapura and other Explorations in the upper Ganga and Sutlej Basins. *Ancient India*. 10-11:5-151.

———. 1968. A Deluge? Which Deluge? Yet another Facet of the Copper Hoard Culture. *American Anthropologist*. 70; 857-863.

———. 1971-72. A Note of the Excavation at Saipai. *Puratattva*. 5; 46-49.

———. 1977. Kalibangan's Contribution to the Understanding of the Indus Civilization. In the Semi-

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

nar on *Indus Civilization: Problems and Issues.* Simla: IIAS.

———. 1979a. Kalibangan and the Indus Civilization. In *Essays in Indian Protohistory.* D.P. Agrawal, and D.K. Chakrabartil eds. 65-97. Delhi: B.R. Pub. Corp.

———. 1979a. West was West and East was East, But When and How did the Twain Meet? The Role of Bhagwanpura as a Bridge between Certain Stages of the Indus and Ganges Civilizations. In the Conference on *The Harappan Civilization: A Contemporary Perspective.* Srinagar: AIIS.

———. 1981. The Two Indian Epics vis-à-vis Archaeology. *Antiquity.* 55; 27-34.

Lal, B.B. and Thapar, B.K. 1967. Excavation at Kalibangan: New Light on the Indus Civilization. *Cultural Forum.* 34; 78-88.

Lambrick, H.T. 1967. The Indus Flood Plain and the 'Indus' Civilization. *The Geographical Journal.* 133 (4); 483-495.

Madhu Bala. 1978. A Survey of the Proto-Historic Investigation in Punjab and the Emergent Picture. *Indian Anthropologist.* 8 (2); 89-118.

———. 1981. Recently Explored Sites in Punjab. *Man and Environment.* 5; 67-69.

Marshall, Sir John. 1931. *Mohenjo-daro and the Indus Civilization* (3 Volumes). London: A Probsthain.

Misra, V.N. 1961. Palaeolithic Culture of Western Rajputana. *Bulletin of the Deccan College Research Institute.* 21; 85-156.

———. 1968. Early Village Communities of the Banas basin, Rajasthan. In *Anthropology and Archaeology: Essays in the Memory of Verrier Elwin.* M.C. Pradhan *et al* eds. 295-310. Bombay: Oxford University Press.

———. 1971. Two Late Mesolithic Settlements in Rajasthan — a Brief Review of Investigations. *Journal of the University of Poona* (Humanities section). 35; 59-77.

———. 1973a. Bagor — A Late Mesolithic Settlement in North-West India. *World Archaeology.* 5 (1); 92-110.

———. 1973b. Problems of Palaeo-ecology, Palaeoclimate and Chronology of the Microlithic cultures of North-West India. In *Radiocarbon and Indian Archaeology.* D.P. Agrawal and A. Ghosh eds. 58-72. Bombay: TIFR.

———. 1976. Ecological Adaptations during the Terminal Stone Age in Western and Central India. In *Ecological Backgrounds of South Asian Prehistory.* K.A.R. Kennedy and G.L. Possehl eds. 28-51. Çornell: Cornell University.

———. 1977. Prehistory and Palaeo-environment of Rajasthan. In *Ecology and Archaeology of Western India.* D.P. Agrawal and B.M. Pande eds. 31-54. Delhi: Concept.

Misra, V.N.; Rajaguru, S.N. Agrawal, D.P.; Thomas, P.K.; Husain Z. and Datta, P.S. 1980. Prehistory and Palaeo-environment of Jayal, Western Rajasthan. *Man and Environment.* 4; 19-31.

Misra, V.N.; Rajaguru, S.N.; Raju D.R.; Raghavan, H. and Gaillard, C. 1982a. Acheulian Occupation and Evolving Landscape around Didwana in the Thar Desert, India. *Man and Environment.* 6:72-86.

Misra, V.N.; Rajaguru, S.N.; Wasson, R.J.; Singh G. and Agrawal, D.P. 1982b. Further Light on Lower Palaeolithic Occupation and palaeo-environment in Semi-Arid Zone of Rajasthan. *Puratattva.* 10.

Mughal, M.R. 1970. The Early Harappan Period in the Greater Indus Valley and Northern Baluchistan. Unpublished Ph. D. Dissertation; Department of Anthropology, Philadelphia: University of Pennylvania.

———. 1972. A Summary of Excavations and Explorations in Pakistan. *Pakistan Archaeology.* 8; 113-158.

———. 1973a *Present State of Research on the Indus Valley Civilization.* Karachi: Department of Archaeology.

———. 1973. Explorations in Northern Baluchistan, 1972: New evidence and Fresh Interpretation. Paper presented at the Second Annual Symposium on Archaeological Research in Iran.

———. 1974. New evidence of Early Harappan culture from Jalilpur, Pakistan. *Archaeology.* 27; 106-113.

———. 1980. The Early Harappan Cultural Phase: A Reply. *Puratattva,* 9; 84-88.

———. 1981. New Archaeological Evidence from Bahawalpur. In *Indus Civilization: New Perspectives.* A.H. Dani ed. 33-42, Islamabad: Quaid-i-Azam University.

Oldham, C.F. 1874. Notes on the Lost River of the Indian Desert. *Calcutta Review.* 59; 1-27.

———. 1893. The Saraswati and the Lost River of the Indian Desert. *Journal of the Royal Asiatic Society* 1893. 49-76.

Oldham, R.D. 1886. On Probable Changes in the Geography of the Punjab and its Rivers: an Historico-Geographical Study. *Journal of the Asiatic Society of Bengal.* 55; 322-343.

Pal, Y., Sahai, B., Sood R.K. and Agrawal D.P. 1980. Remote Sensing of the 'Lost' Sarasvati River *Proceedings of the Indian Academy of Sciences* (Earth Planetary Science). 89 (3); 317-331.

Pande, B.M. 1977. Archaeological Ramains on the Ancient Saraswati. In *Ecology and Archaeology of Western India.* D.P. Agrawal and B.M. Pande ed. 55-59. Delhi: Concept.

Piggott Stuart 1950. *Prehistoric India to 1000 B.C.* Harmondsworth (Middlesex): Penguin Books

Possehl, G.L. 1967. The Mohenio-daro Floods: A

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Reply. *American Arthropologist.* 69 (1); 32-40.

———. 1979. ed. *Ancient Cities of the Indus.* New Delhi. Vikas.

———. 1980. *Indus Civilization in Saurashtra.* Delhi: B.R. Publishing Corporation.

Raikes, R.L. 1964. The End of the Ancient Cities of the Indus. *American Anthropologist.* 66 (2); 284-299.

———. 1968. Kalibangan: Death from Natural Causes. *Antiquity.* 42 (168); 286-291.

Raikes, R.L. and Dyson Jr., R.H. 1961. The Prehistoric Climate of Baluchistan and the Indus Valley. *American Anthropologist.* 63 (2); Pt. I; 265-281.

Ramaswamy, C. 1968. Monsoon over the Indus Valley during the Harappan Period. *Nature.* 217 (5129); 628-629.

Rao, S.R. 1963. Excavations at Rangpur and other Explorations in Gujarat. *Ancient India.* 18-19 (1962 and 1963); 5-207.

———. 1973. *Lothal and the Indus Civilization.* Bombay: Asia Pub. House.

———. 1979. New Light on the Post-Urban (Late Harappan) Phase of the Indus civilization in India. In a conference on *The Harappan civilization: A Contemporary Perspective.* Srinagar: AIIS.

Sahni, D.R. *Archaeological Remains and Excavations at Sambhar during Samvat 1993 and 1994 (1936-37 and 1937-38 A.D.)* Jaipur: Directorate of Archaeology and Historical Research.

Seth, S.K. 1978. The Dessication of the Thar Desert and its Environs During the Protohistorical and Historical Periods. In *The Environmental History of the Near and Middle East.* William C. Brace ed. 279-305. London: Academic Pres.

Shaffer, J.G. 1978. *Prehistoric Baluchistan.* Delhi: B.R. Pub. Corp.

———. 1981. The Protohistoric Period in the Eastern Punjab: A Preliminary Assessment. In A.H. Dani ed. *Indus Civilization: New Perspective.* pp. 65-102. Islamabad: Quaid-i-Azam University.

Sharma, Y.D. ed. 1971-72. OCP and NBP: 1971. (Proceedings of the Seminar held by the Indian Archaeological Society, on 11 May 1971, at the National Museum, New Delhi, on Ochre Coloured Ware and Northern Black Polished Ware). *Puratattva.* 5; 1-83.

———. 1976. Transformation of the Harappa culture in the Punjab. In *Archaeological Congress and Seminar.* U.V. Singh ed. 5-15. Kurukshetra: Kurukshetra University.

———. 1977. Bara and the So-called Late Harappa cultures of Punjab. In the Seminar on *Indus Civilization: Problems and Issues.* Simla: IAAS.

Singh, G. 1971. The Indus Valley Culture (Seen in the Context of Post-Glacial Climate and Ecological Studies in North-West India). *Archaeology and Physical Anthropology in Oceania.* 6 (2); 177-189.

Singh, G.; Joshi, R.D.; Chopra, S.K. and Singh, A.B. 1974. Late Quaternary History of Vegetation and Climate of the Rajasthan Desert, India. *Philosophical Transactions of the Royal Society of London.* (Biological Sciences) 267 (889); 467-501.

Singh, U.V. 1977. Late Harappan Culture as revealed by the Excavations at Mirzapur and Daulatpur, District Kurukshetra (Haryana). In the Seminar on *Indus Civilization: Problems and Issues.* Simla: IIAS.

Stein, Sir Aurel. 1931. An Archaeological Tour of Gedrosia. *Memoirs of the Archaeological Survey of India.* 43. New Delhi: Government of India Press.

———. 1942. A Survey of Ancient Sites along the 'Lost' Sasrasvati River . *The Geographical Journal.* 99 (4); 173-182.

Suraj Bhan. 1971-72a. Siswal: A Pre-Harappan Site on the Drishadvati Valley. *Puratattva.* 5; 44-46.

———. 1971-72b. OCP and NBP: 1971. *Puratattva.* 5;.16-21.

———. 1972. Changes in the Course of Yamuna and their Bearing on the Protohistoric Cultures of Haryana. In *Archaeological Congress and Seminar Papers.* S.B. Deo ed. 125-128. Nagpur: Nagpur University.

———. 1973. The Sequence and Spread of Prehistoric Cultures in the Upper Saraswati Basin. In *Radiocarbon and Indian Archaeology.* D.P. Agrawal and A. Ghosh eds. 252-263. Bombay: TIFR.

———. 1975. *Excavations at Mitathal (1968) and other Explorations in the Sutlej-Yamuna Divide.* Kurukshetra: Kurukshetra University Press.

———. 1977. The Protohistoric settlement pattern in Haryana. In the Seminar on *Indus Civilization: Problems and Issues.* Simla: IIAS.

Suraj Bhan and Shaffer, J.G. 1978. New Discoveries in Northern Haryana. *Man and Environment.* 2; 59-68.

Thapar, B.K. 1973a. Synthesis of the Multiple Data as obtained from Kalibangan. In *Radio-carbon and Indian Archaeology.* D.P. Agrawal and A. Ghosh eds. 264–271. Bombay TIFR.

———. 1973b. New Traits of the Indus Civilization at Kalibangan: an Appraisal. In *South Asian Archaeology.* N. Hammond ed. 85-104. Park Ridge: Noyes Press.

———. 1975. Kalibangan: A Harappan Metropolis Beyond the Indus Valley. *Expedition.* 17 (2); 19-32.

———. 1977. Climate during the period of the Indus Civilization: Evidence from Kalibangan. In *Ecology and Archaeology of Western India.* D.P. Agarwal and B.M. Pannde eds. 67-73. Delhi: Concept.

———. 1981. The Mosaic of Indus Civilization beyond the Indus Valley. *In Indus Civilization: New Perspectives,* A.H. Dani ed. 55-64. Islamabad: Quaid-i-Azam University.

Thomas, P.K. 1975. Role of Animals in the Food Economy of the Mesolithic Culture of Western and

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Central India. In *Archaeological Studies.* A.T. Clason ed. 322-328. Amsterdam: North-Holland.

Vishnu-Mittre. 1972. Palaeobotany and the Environment of Early Man in India. In *Archaeological Congress and Seminar Papers,* S.B. Deo ed. 206-212. Nagpur: Nagpur University.

———. 1978. Palaeosecology of the Rajasthan Desert during the Last 10,000 Years. The *Palaeobotanist.* 25; 549-558.

Vishnu-Mitttre and Savithri, R. 1979. Food Economy of the Harappans. In the Conference on *The Harappan Civilization: A Contemporary Perspective.* Srinagar: AIIS.

Wheeler, Sir Mortimer. 1953. *The Indus Civilization.* Cambridge: Press.

———. 1961. Ancient India: The Civilization of the Sub-Continent. In A. Piggott ed. The *Dawn of Civilization.* pp. 229-252. London: Thames and Hudson.

———. 1968.*The Indus Civilization.* 3rd. Edition. Cambridge: Cambridge University Press.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

49

Yash Pal, Baldev Sahai, R.K. Sood and D.P. Agrawal

Remote Sensing of the 'Lost' Sarasvati River

The area lying between the rivers Indus and Ganga has been the cradle of many important civilizations. The availability or lack of waters in the rivers flowing in this region determined the growth or decay of these civilizations. The river Sarasvati is said to have been a mightier river than even the Indus in the Vedic and pre-Vedic times. Stein (1942) refers to the fact that in at least three passages in the *Rigveda*, the oldest surviving record in any Indo-European language, a river course has been mentioned which corresponds to the present Sarsuti (Sarasvati) and Ghaggar. *Nadistuti*, the famous hymn, describes the Sarasvati as flowing between the Yamuna in the east and the *Satudri* (Satluj) in the west. Since none of the present rivers obviously fits in with this description, the appellation 'lost' Sarasvati has often been applied to this once mighty historical river.

There is considerable literature on the subject trying to identify the Sarasvati and to explain the desiccation of this region. A variety of hypotheses, often conflicting, have been put forth by various scholars like Oldham (1874), Krishnan (1952), Wadia (1975), Singh (1952), Stein (1942) and Indras (1967). Inadequacy of data has obviously lent itself to a variety of interpretation. To have a fresh look at the problem, Landsat imagery has been used for delineating the palaeo-channels of the Satluj, the Yamuna and the Sarasvati so as to unravel the mystery of the 'lost' Sarasvati. We find that the Landsat imagery with its synoptic views provides quite clear evidence for the delineation of the palaeo-channels and hence the course of the Sarasvati.

Techniques

The present study is essentially based on visual interpretation of the Landsat imagery pertaining to the period 1972-77, in a variety of forms and formats. The Imagery used here comprises multispectral scanner (MSS) data in four spectral bands (0.5-0.6, 0.6-0.7, 0.7-0.8 and 0.8-1.1 um). In the interpretation of this imagery the enhancement techniques comprising enlargements, colour comprises prepared by colour additive viewer and the Diazo technique, density slicing, grey scale conversion, contrast stretching, band ratioing, using both the diapositives as well as the negatives, have been used (Sood *et al* 1978).

Apart from black-and-white paper prints and their mosaics, the negatives and diapositives in 70-mm and 23-cm format were enlarged to 1:250,000 scale topographical maps supplied by the Survey of India.

The palaeo-channels, in most of the cases, stand out clearly because of the vegetation patterns on their beds. In other cases, the enhancement techniques help in delineating such channels.

Since the Landsat images any scene on the earth's surface every 18 days, a comparison of multidate imagery helped in making use of the seasonal effects also in demarcating these palaeochannels.

River Systems

The present river systems of the Satluj-Yamuna Divide which have a bearing on the subjects are

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

the Satluj, the Ghaggar, the Sarasvati, the Markanda, the Chautang, the Yamuna and their tributaries.

The rivers Satluj and Yamuna are perennial rivers, rising from the Himalayas and fed by glaciers. The rivers Ghaggar, Sarasvati, Markanda and Chautang all rise from the Siwalik Hills and are non-perennial. They flow mainly during the monsoon. At present none of them reaches the sea or joins any major river as a tributary.

These river systems can be grouped into two main systems : (i) The Satluj System, and (ii) The Ghaggar System.

The Satluj System

Rising in the Himalayas, the present Satluj River takes a sharp, almost right-angled, turn to the west near Ropar. It continues to flow westward for more than 150 km and is then joined by the Beas, which comes from the northeast, near Harike. Only after this confluence the Satluj turns southwest **(fig. 49.1)**

The study of Landsat imagery brings out the following:

(i) The sharp westward right-angled bend **(fig. 49.2)** in the course of the Satluj is suggestive of its diversion in the past, as at the point or river capture or stream diversion similar elbows develop. No physical obstruction has been reported which could be responsible for this diversion. *215*

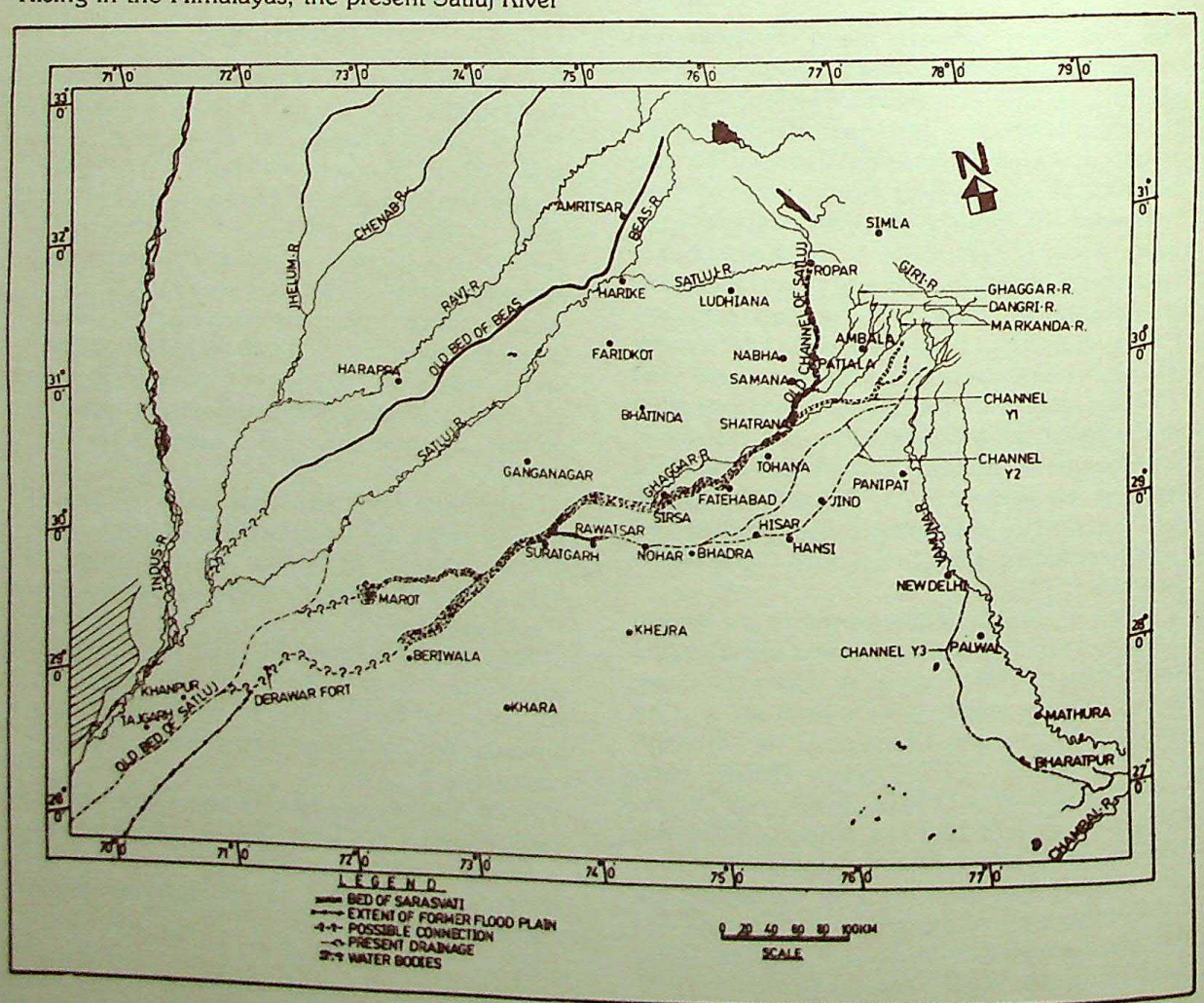


Fig.49.1. Northwestern Indian subcontinent with its present river system and the major palaeo-channels as deciphered from the Landsat imagery

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

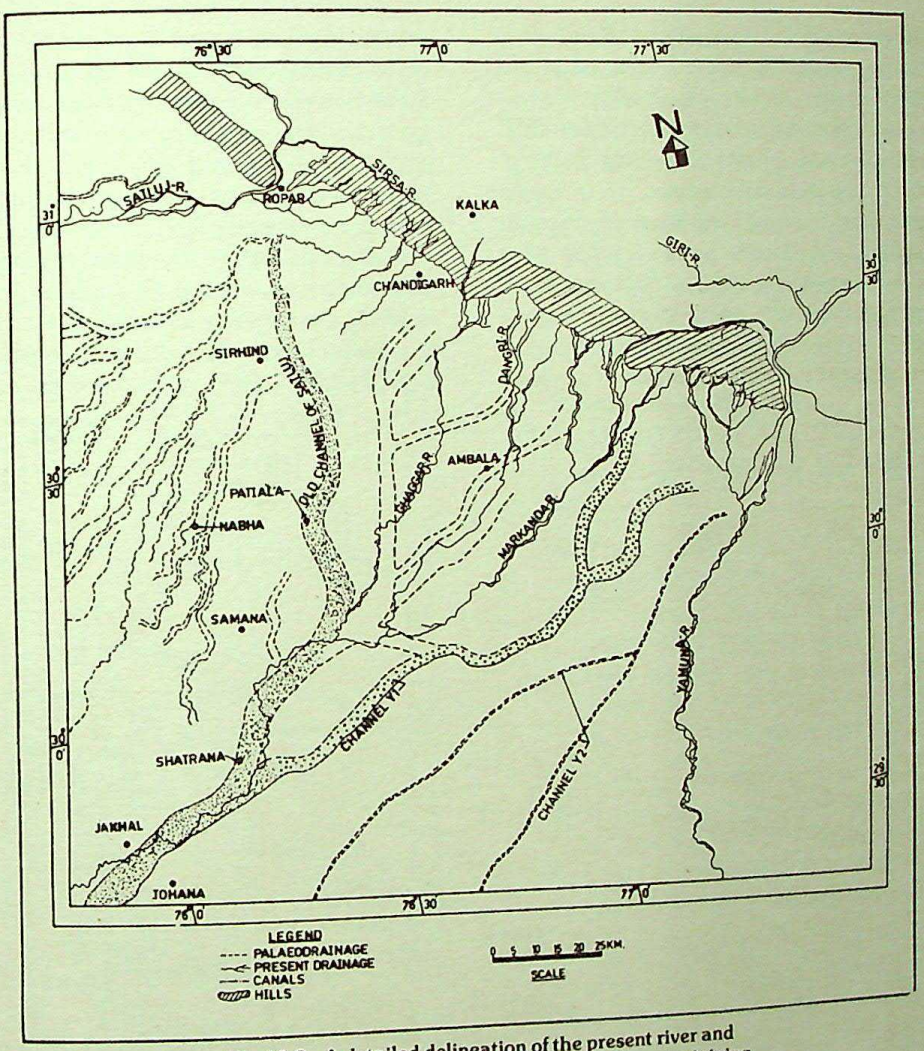


Fig.49.2. A detailed delineation of the present river and the palaeo-channels of the Satluj and the Yamuna joining the old bed of the Sarasvati

(ii) There is a sudden widening of the Ghaggar Valley about 25 km south of Patiala which is obviously a misfit if we take into account the considerably narrow bed of the Ghaggar upstream. This sudden widening can be explained only if a major tributary was joining the Ghaggar at this place. The satellite imagery does show a major palaeo-channel joining the Ghaggar here **(fig. 49.3)**.

Thus we see that both the sudden diversion of the Satluj westward and the abrupt widening of the Ghaggar bed south of Patiala can be explained only if we assume that the Satluj was coming through the palaeo-channel into the Ghaggar system at some point of time in the past. Our observations are supported by the field data of Singh (1952) who mentions a channel starting near Ropar and leading towards Tohana (29° 3–5 N, 75° 5–5E).

The area along this old course of the Satluj is called 'dhaia' meaning an upland or a high bank (Singh 1952).

For the diversion of the Satluj three main causes could be responsible:

(i) Tectonic uplift which forced the Satluj to abandon its channel and to start flowing westward.

(ii) Capture of the Satluj by a tributary of the river Beas through headward erosion; and

(iii) Existence of a fault through which the Satluj diverted.

216

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

The physiography of the region shows that there is a depression westward (elevation less that 230 m) of the old Satluj bed and a corresponding uplift eastward (elevation more than 250 m). This may have gradually forced the Satluj to flow through its present channel. It is amply demonstrated by the multitude of small channels **(fig. 49.4)** into which the Satluj braided till it found its present channel **(figs. 49.3 and 4)**. If one examines the old bed of the Ghaggar (Sarasvati) it shows a peculiar feature: it tends to flow along straight lines joined together at sharp angles **(figs. 49.1 and 3)**. Obviously, this reflects a structural control as the old Ghaggar seems to have flowed into an unstable channel controlled by the lineaments, probably enechelon faults. It might have required only a little tectonic movement to disturb its previous course and force it into its present channel.

Our studies thus show that the Satluj was the main tributary of the Ghaggar and that subsequently the tectonic movements may have forced the Satluj westward and the Ghaggar dried.

Wilhelmy (1969) considered the second alter-

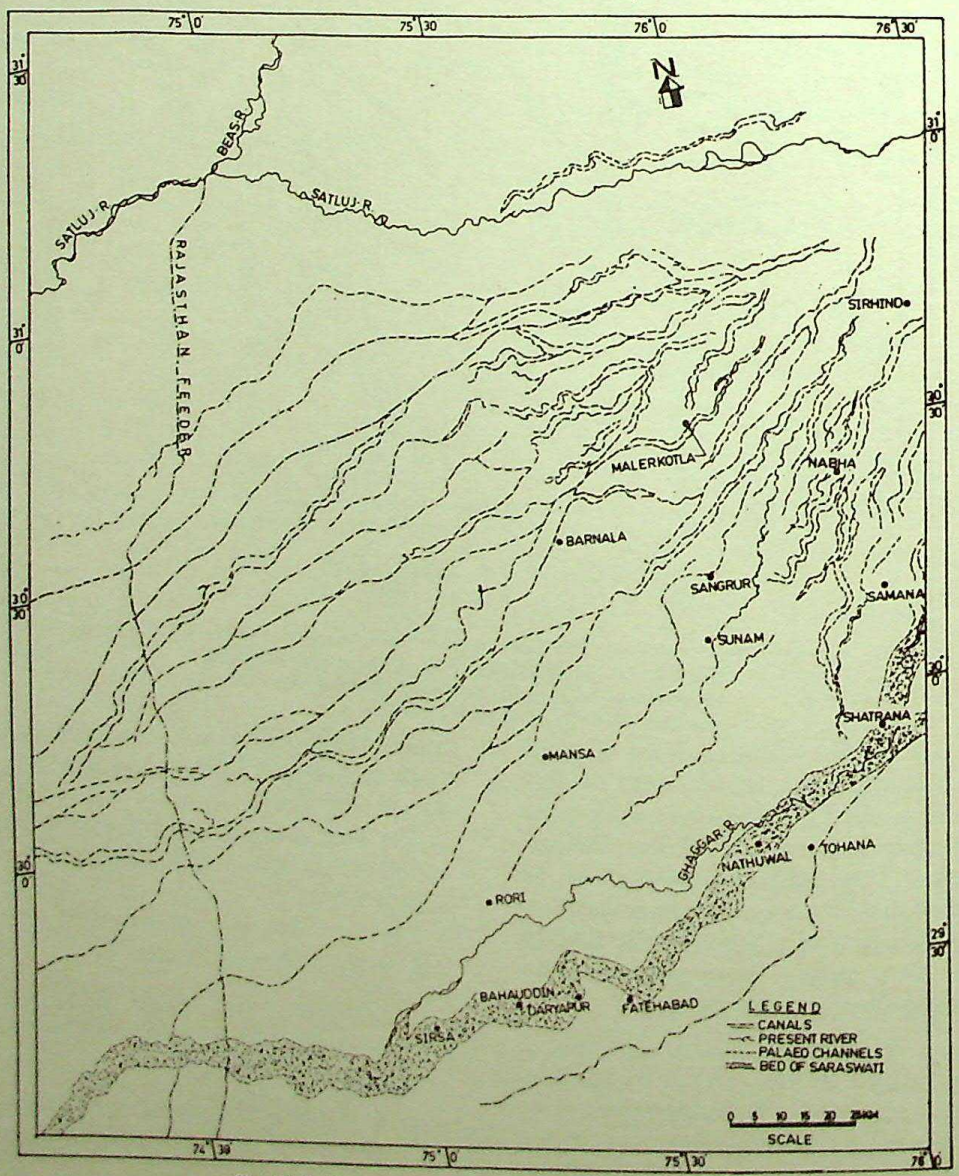


Fig.49.3. Braided palaeo-channels of the Satluj lying between the present Satluj and the old Sarasvati bed. The present Ghaggar can also be seen in the figure

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

native, *i.e.*, river capture. The Satudri might have been a tributary of the Vipasa (Beas) and through headward erosion captured the waters of the river coming down the Himalayas near Ropar. Tectonic movements may have aided the river capture.

The braiding of the Satluj seems to have been echoed in a legend related in the *Mahabharata* which says that when Vasishtha threw himself into the Satluj to commit suicide the river broke up into a hundred channels (Oldham 1874).

We have also examined the Landsat imagery of the Indus system and it appears that the confluence of the Satluj with the Indus may not be an ancient feature. The palaeo-channel of the river Beas, which is quite conspicuous in Landsat Imagery, joined the Indus independent of the Satluj **(fig. 49.1)**. There is a distinct palaeo-channel which seems to suggest that the Satluj flowed through the Nara directly into the Rann of Kutch **(figs. 49.3 and 4)**. 214

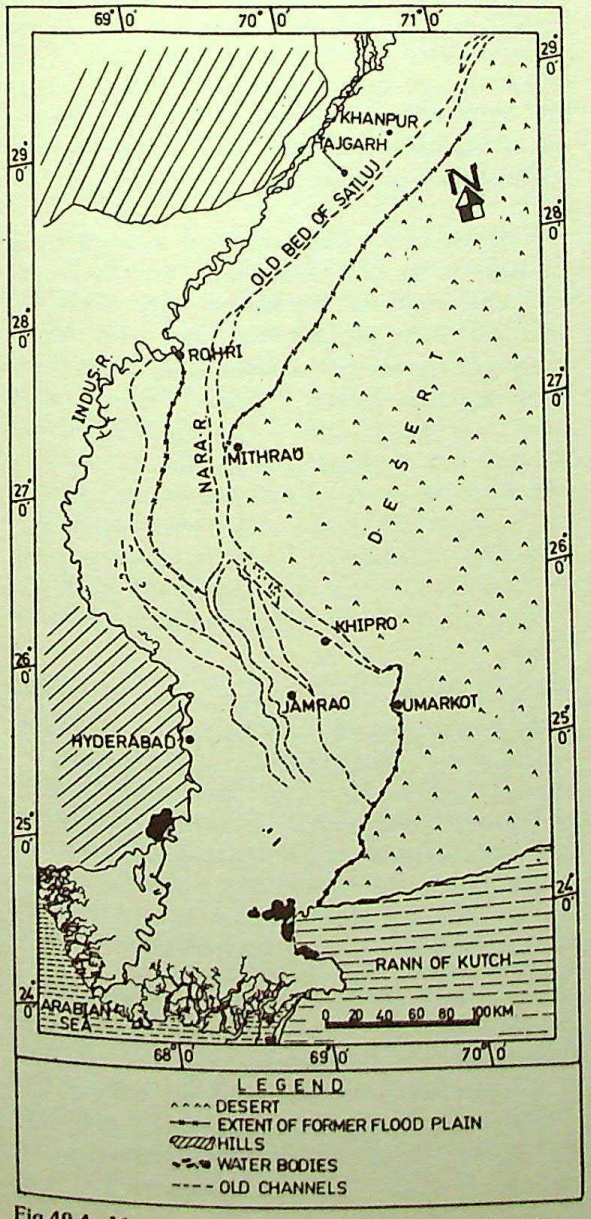


Fig.49.4. Mapping of the Sarasvati-Nara-Rann of Kutch connection from the satellite imagery. The map shows that the Sarasvati debouched into the Rann of Kutch through Nara

The Ghaggar System

We summarise below our observations on the Ghaggar system from the analysis of Landsat imagery.

(i) The ancient bed of the Ghaggar has a constant width of about 6 to 8 km from Shatrana in Punjab to Marot in Pakistan **(figs. 49.1 and 2)**. The bed stands out very clearly having a dark tone in the black-and-white imagery and reddish one in false colour composites.

(ii) There is a clear palaeo-channel southeast of the river Markanda which joins the ancient bed of the Ghaggar near Shatrana Channel Y1 (1 and 2). The present Sarasvati mostly flows through this channel.

iii) Another channel, Y2, which corresponds to the present Chautang seems to join the Ghaggar near Suratgarh **(fig. 49.1)**.

(iv) Near Anupgarh the ancient Ghaggar bed bifurcates and both the palaeo-channels come to an abrupt end; the upper one terminates near Marot and the lower one near Beriwala **(figs. 49.1 and 2)**.

These two terminal channels of the Ghaggar seem to disappear in a depression which is suggested by salt encrustation and the physio-graphy of the area.

There is no indication of any palaeo-channel connecting the ancient Ghaggar with the Indus or the Luni.

Discussion

The vast expanse (6-8 km wide) of the Ghaggar bed can be explained only by assuming that some major tributaries were flowing into it in the past. It was mentioned earlier that at some point

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

of time the Satluj was also flowing through it. The other major river system contributing waters to the Ghaggar may have been some prior channel of the Yamuna. The evidence regarding the palaeo-channels of the Satluj-Yamuna Divide can be interpreted in the following manner. The three palaeo-channels Y1, Y2 and Y3 shown in **fig. 49.1** represent courses of some sizable ancient river which flowed south-east of the river Markanda and into the Ghaggar or into the Chambal during different periods. Channel Y1 joined the ancient bed of Ghaggar, Channel Y2 flowed into Chautang (Drishadvati) and Channel Y3 flowed through the present course of the Yamuna down to Delhi and then connected the small lakes south-eastward, past Bharatpur, and finally-joined, probably, the Chambal. One could give this vagrant river the name of Palaeo-Yamuna. It would, therefore, mean that the Palaeo-Yamuna changed its course three times before assuming the present one. In the first instance it flowed through Channel Y1 into the ancient Ghaggar. Later on, it flowed through Channel Y2, which includes the present Chautang, and met the Ghaggar near Suratgarh. The third time it went southward and passed through the Channel Y3, joining the Ganga through the Chambal.

We are working with the archaeologists to date these episodes in the life of the Palaeo-Yamuna. The available data show that the Channel Y3 of the palaeo-Yamuna was alive during the Painted Grey Ware (PGW) period (c. 800-400 B.C.) as indicated by the distribution of the PGW sites on its banks (Gupta *et al* 1977). Both the Chautang and the Ghaggar beds have archaeological mounds on their banks (Pande 1977; Dikshit 1977).

The Ghaggar continued to be a living river during the pre-Harappan (c. 2500-2200 B.C.) and the Harappan times (c. 2200-1700 B.C.) (radiocarbon dates). Even during the PGW times, there is some indication of habitation along the palaeo-channel, though the PGW mounds follow a very narrow river bed, perhaps indicating a dwindling water supply. The archaeological evidence for dating the Chautang is not very definite yet, though the late Harappan mounds along it appear to be a clear indication that it was a living river during at least the late Harappan time (c. 1700-1000 B.C.). Thus we see that during the last 5000 years or so the rivers of this area have changed their courses several times.

The history of these palaeo-channels seems to be fairly clear now, but there are still some lacunae in our knowledge as to the final date of the ancient Ghaggar. The satellite imagery seems to show as if it debouched into sea or a lake near Marot or Beriwala **(fig. 49.1)**. But to bring the sea so far inland in the mid-Holocene times looks quite improbable. The work of Agrawal and Guzder (1972) and S.K. Gupta (1972) on the western coast shows that the magnitude of the mid-Holocene marine transgression was only of the order about + 5 metres from the present mean sea-level. Therefore we have to look for some other interpretation.

A profile of the land elevation shows that the Ghaggar ends in a depression: both westward and north-eastward the land elevation rises. For miles and miles around Marot one finds numerous place-names with a suffix *toba*, which in the local language means a *playa*. This area may have been turned into a large lake in the first instance but desiccation led to the formation of *playas*. It is obviously improbable for such a mighty river to vanish into a shallow depression in its heyday. There is, therefore, a good possibility that the Ghaggar flowed into the Nara and further into the Rann of Kutch without joining the Indus.

The chain of tectonic events which diverted the Satluj westward and the Palaeo-Yamuna south-eastward was perhaps also responsible for the subsidence near Marot and Beriwala into which the Ghaggar seems to have vanished. This alone can explain the 'death' of such a mighty river into a lake because its main feeders, the Satluj and the Palaeo-Yamuna, were weaned away from it by the Indus and the Ganga, respectively.

Raikes published a paper in *Antiquity* in 1968 on the vagrancy of the Yamuna. He explained the vagrancy of the Yamuna under the influence of *Coriolis* force. He tabulated six shifts of the Yamuna during the period 2500 B.C.-A.D. 500 giving exact dates. It is difficult to understand as to why Coriolis force should affect the river Yamuna only and not other rivers around the world and why only during particular periods. We, however, feel the necessity of pointing out

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

that the whole of the nortn-western India has to be taken into cosideration to understand the vagrancy of practically all the rivers in this region. The causes for this vagrancy lie in neotectonism shown by the enechelon nature of the structural control along the main river systems in this area. The evidence for neotectonism is very clear in the rock-cut terraces on the upper reaches of the Markanda, as pointed out by Rajaguru (1977). We have further evidence of earthquakes and abandonment of the site from the Kalibangan excavations (Lal 1979). The *Mahabharata* episode of Vashishtha mentioned earlier appears to be an echo of the same tectonism.

The short paper by Gose *et al* (1980) about the fluvial sedimentation in the Rajasthan desert covers palaeo-channel configurations, their chronology and their relationship with the palaeoclimatic changes. Our detailed study of the satellite imagery, employing all the available techniques, has however not shown any palaeo-channel which could join the river Luni with the old Ghaggar bed. We have therefore given the original Landsat imagery mosaic **(fig. 49.2)**so that our maps can be tallied with the observational data.

Conclusions

Palaeo-environmental changess in the north-western subcontinent have been caused by climatic, tectonic and anthropogenic factors. Tectonic factors assumed such overwhelming importance only because the major channels like those of the Sarasvati were structurally controlled by enechelon faults. It was because of this reason that even relatively minor tectonic movements caused considerable changes in the configuration of the palaeo-channels. The distribution of the archaeological sites was also determined by the vagrancy of these rivers.

As discussed above, during the period 4-5 millennia B.P. north-western Rajasthan was a much greener place with the Sarasvati flowing through it. Some of the present rivers joined to make the Sarasvati a mighty river which probably discharged into the sea (Rann of Kutch) through the Nara, without joining the Indus.

We have thus shown that the Satluj flowed into the Ghaggar once. Some ancient version of the Yamuna (we termed it Palaeo-Yamuna) changed its course, at least three times, before joining the Ganga through its present course.

REFERENCES

Agarwal, D.P. and Guzder, S. 1972. *Palaeobotanist* Vol. 21, 216

Dikshit, K.N. 1977. *Ecology and Archaeology of Western India*, eds. D.P. Agarwal and B.M. Pande (New Delhi: Concept Pub.) 61

Ghose, B. Amal Kar and Zahid Husain 1980. *Man and Environment* Vol. 4, 8

Ghosh, A. 1952. *Bull. Natl. Inst. Sci. India*, Vol. 1, 37

Gupta, S.K. 1972. *J, Goel* Vol. 80, 357

Gupta, S.P., Shashi Asthana and Amarendra Nath 1977. *Ecology and Archaeology of Western India*, eds. D.P. Agarwal and B.M. Pande (New Delhi: Concept Pub.) 79

Indras 1967. *Lost Sarasvati* (Vallabh Vidyanagar: Sardar Patel University)

Krishnan, M.S. 1952. *Bull. Natl. Inst. Sci. India*, Vol. 1, 19

Lal, B.B. 1979. *Essays in Indian Prothohistory*, eds. D.P. Agarwal and D.K. Chakrabarti (New Delhi: Concept Pub.) 65

Oldham, C.F. 1874. *Calcutta review*, Vol. 59, 1

Pande, B.M. 1977. *Ecology and Archaeology of Western India*, eds. D.P. Agarwal and B.M. Pande (New Delhi: Concept Pub.) 55

Raikes, R.L. 1968. *Antiquity*, Vol. 42, 286

Rajaguru, S.N. 1977. *Ecology and Archaeology of Western India*, eds. D.P. Agarwal and B.M. Pande (New Delhi: Concept Pub.) 70

Schumm, S.A. 1971. *River Mechanics*, ed. H.W. Shen (Fort Collins: H.W. Shen) Vol. 1, 4-1

Singh, Gurdev 1952. *The Geography*, Vol. 5, 27

Singh, S. and Ghose, B. 1977. *Ecology and Archaeology of Western India* eds. D.P. Agarwal and B.M. Pande (New Delhi: Concept Pub.) 135

Sood, R.K., Baldev Sahai and Subramayam V. 1978. *Proceedings of symposium on Morphology and evolution of landforms* (Delhi: Department of Geology, University of Delhi) 131

Stein, A. 1942. *Geographical Journal*, Vol. 99, 173

Wadia, D.N. 1975. *Geology of India* (New Delhi: Tata McGraw-Hill) 52

Whilhelmy, H. 1969. *Z. Geomorphol. Suppl.* Vol. 8, 76.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

50

M.R. Mughal

The Post-Harappan Phase in Bahawalpur distt., Pakistan

In February 1973, when the present writer presented his paper on the *Present State of Research on the Indus Valley Civilization* to the International Symposium on Mohenjo-daro held at the site of Mohenjo-daro, Sir Mortimer Wheeler who presided over the session, urged me to conduct extensive surveys of "of Sir Aurel Stein's kind" in the so far unexplored regions of Pakistan and especially in Bahawalpur which offered great promise for the archaeologists. It was unfortunate that Sir Mortimer Wheeler did not live to see his wish come ture. The very next year in the cold season of 1974, a comprehensive programme of field surveys was launched by Pakistan's Department of Archaeology & Museums under the direction of the present author in the east-central part of the Greater Indus Valley constituting the former State of Bahawalpur. Four seasons of concerted efforts betwen 1974 and 1977 completely changed the archaeological map of central Pakistan in addition to yielding an astonishingly rich cutural data.

A part of Bahawalpur, from Fort Abbas to Derawar, was first examined by Aurel Stein in 1941 (1942) who followed the dry bed of the Hakra River in continuation of his explorations along the same river course called Ghaggar in the Indian State of Rajasthan. Some sites were visited by Henry Field (1959) but no proper explorations of the area were undertaken. Prior to the 1950's identification of meagre evidence from Bahawalpur was generally based on the known (Mature) Harappan materials. In the Indian territory, further explorations by A. Ghosh (1953) who also re-surveyed the area covered earlier by Stein, by K.N. Dikshit (1967), Katy F. Dalal (1980) and a decade of excavations at Kalibangan located on the Ghaggar by B.B. Lal and B.K. Thapar have made significant changes in the cultural mosaic of northern Rajasthan bordering Bahawalpur. Further eastwards in the present day districts of Haryana and Punjab, intensive field work by Suraj Bhan (1973 and 1975) Jim G. Shaffer (Bhan and Shaffer 1978), followed by an admirable analysis of the new evidence (Shaffer 1980 and 1980a) has provided a good basis for reconstructing protohistoric cultural succession in that region. A clear picture is beginning to emerge out of isolated site descriptions and scattered lists of site-names.

The field work undertaken in the desert tract of Bahawalpur called Cholistan was the first major exploration ever undertaken by the Department of Archaeology & Museums on an extensive scale. In terms of number of sites, their functional articulation, cultural association and distribution pattern, the results came out to be unexpectedly very impressive. Among 414 sites recorded, 99 belonged to a newly identified cultural assemblage of fourth millennium B.C., called the Hakra Wares; 40 were assignable to the Early Harappan period of the early third millennium B.C., contemporary with the Kot Dijian and related assemblages of the Greater Indus Valley; 174 sites represented the mature phase of the Indus Civilization of the mid-and second half of third millennium B.C.; 50 sites belonged to the Late Harappan period contemporary with the Cemet-

217
218
219–23

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ery H phase of occupation represented at the site of Harappa which is believed to fall in the second millennium B.C.; and 14 sites, all concentrated in the north-eastern part of Bahawalpur, yielded characteristic Painted Grey Wares (hereafter PGW) asociated with an abundance of red wares which are generally bracketed within the first half of the first millennium B.C. The remaining sites, including standing monuments, belonged to the historic and Medieval periods (**fig. 50.1**). Initial comments on the protohistoric data were presented for the first time after four years work to an International Seminar on the Indus Valley Civilization held at Karachi between December 30, 1978 and January 2, 1979 (Mughal 1980). In the meantime, the entire data have been analysed and studied in detail and presentd in the final report entitled: *Archaeological Survey in Bahawalpur* (Mughal 1982). The present paper which addresses itself to the post-Harappan scene of the Ghaggar and, therefore to the PGW sites only, is based on the data presented in the final report on Bahawalpur.

Since the 1950's, the PGW have been gaining increasing significance in South Asian later protohistory. These have been recognised as a distinct grey coloured ceramic group made of fine and well-levigated clay and well fired. This group is either plain with smooth surface on both sides but often showing application of thick dark slip, or painted with black linear designs. Their forms are limited mostly to small and medium sized cups, bowls and dishes with incurved, vertically strainght or flared-out rim and often with carination at or above the base. Red pottery duplicating the painted and unpainted PGW forms also occurs in limited number. The other ceramics associated with the PGW and representing over 95 per cent of the total assemblage consist of plain, stamped and incised red wares of different fabrics, forms and even firing process. Examples of pottery fired to red colour externally and black core or/and inner surface which is often labelled as 'Black-and-red Ware' are also reported with the PGW or their associated assemblages. To date, the PGW has been identified at more tha . three hundred sites located in western Uttar Pradesh, Punjab, Haryana and northern Rajasthan (Tripathi 1976). A number of sites have also been trenched to varying scale during the past thirty years.

The research on the PGW and interpretations of the associated materials have largely remained focussed on their assumed connection with the early movements of the Aryan speaking people into South Asia and their material culture. The radiocarbon dates so far available from the PGW-bearing deposit from widely-separated sites

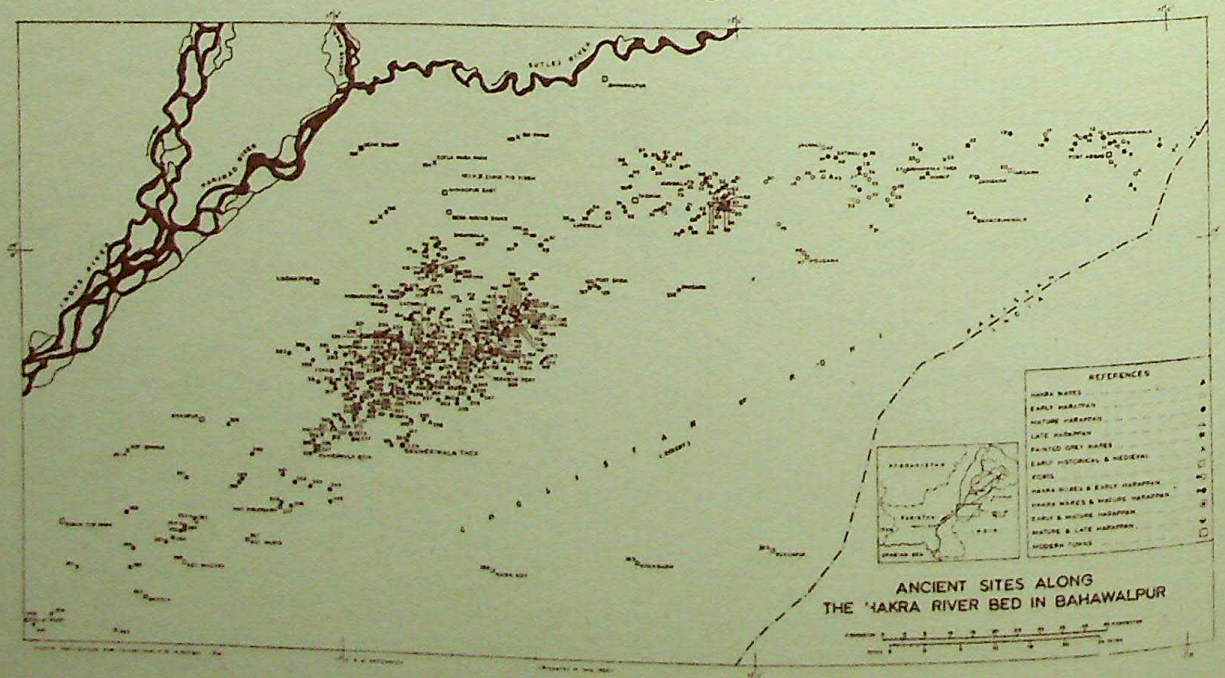


Fig.50.1. Ghaggar-Hakra: Explored sites

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

bracket them into *circa* 1100/1000 - 400 B.C. with MASCA correction. However, the sites located in Rajasthan, namely, Jodhpura and Noh (near Bharatpur area), apparently seem to fall in the first quarter of the first millennium B.C. (Lal 1980). In Uttar Pradesh, Atranjikhera has yielded the earliest known date of 1155 B.C. (TF-191) with MASCA correction for the lowest PGW levels. While debate on precise chronological range of the PGW (Gupta 1978) and its cultural implication still continues, the claim by J.P. Joshi (1978) of possible links between certain Late Harappan traits and those of the PGW at Bhagwanpura and Dadheri and suggested continuity from Siswal C-D (contemporaneous with Late Harappan) to the PGW period are prompting new interpretations (Shaffer 1980a and 1980b) which sharply question the views based on linguistic and literary evidence concerning assumed population migration into South Asia during the first millennium B.C. and their association with the PGW.

Prior to the recent surveys in Bahawalpur, the PGW remained unknown in Pakistan due to lack of identification. Stein however did mention (1942) the presence of pottery with 'impressed patterns' along the north-eastern part of the Hakra. This type of pottery is now recognised to be associated with the PGW material assemblages. In this context, it is pointed out that claims of occurrence of the PGW at Harappa (Allchin 1968: 210) and Lakhyo-Pir in Sind (Agrawal and Kusumgar 1974: 127) have no validity. It seems that the plain grey pottery of different fabric and forms which did exist during the Mature and Late Harappan (Cemetery 'H' related) periods has been confused with the PGW. In Bahawalpur, the ceramic materials collected from the surface and disturbed sections of the PGW sites afford good parallels with contemporary sites in northern Rajasthan. Both plain and painted grey pottery occur with the red wares decorated with impressed designs along with a limited number of what is called 'Black-and-red' pottery across the border and is found in such contexts which await proper definition. B.B. Lal and B.K. Thapar who have examined the entire unpublished collection from the PGW sites during their visit to Karachi in 1980 also noted the presence of red ware pieces of bowls or dishes with incurved or vertical sides and carinations which they thought were prototypes of the Grey Ware forms of an 'early' group. In the absence of any excavation, general consensus among the South Asian scholars who have seen the assemblages from the PGW sites in Bahawalpur during the past few years is that some of its materials could be equated with those assignable to the first quarter of the first millennium B.C. in India. The accompanying illustrations though very selective, show the recurrent ceramic types of the PGW.

In all, fourteen sites representing, as far as the surface features indicate, settlements of the PGW period have been noted along 160 km long stretch of the old Hakra River bed **(fig.50.2)**. All seem to represent single-period sites because no evidence of preceding or succeeding occupation was found on any site. The sites are situated right in river bed and along the lost course of the Hakra. That strip of river alluvium, 2 to 5 and even more km wide, is the most fertile belt of land now irrigated by the Hakra and Desert Branch canals. Few sites have been levelled down but those still intact, survive to the heights varying from 1.8 to 4 m from the surrounding plain level. An apparent blank area about 45 km long **(fig. 50.2)** seen between Gharanwali (site No. 41) and Chak 103 (site No. 92), is at present very intensively cultivated. The PGW sites must have existed there originally, all of which are wiped out now. Among fourteen sites, thirteen are less than four hectares in size and only one, Satwali (No.40), located almost in the middle of lateral chain of sites between Yazman and India's border, spreads over an area of 13.7 ha. Three sites are less than one hectare in size while six are between one and two hectare, and only four range from 2 to 4 hectare in area.

In order to point out differences in the settlement patterns through time on the Hakra, a brief reference seem to be necessary to the phenomenon preceding the PGW period. In terms of settlement location, size and function, a radical change from the preceding Late Harappan to the PGW period is apparent. The Late Harappan sites are concentrated south of Bahawalpur city from near about Yazman up to west of Derawar. Before the first millennium B.C., that portion of the Hakra was fed by a channel from the Sutlej River which joined the Hakra east of Yazman. The cutting off of water supply from that channel

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

seems to have forced abandonment of that area which was inhabited densely during the Late Harappan and earlier periods. All the known PGW sites mark new locations in an area most of which was already deserted during the Mature and Late Harappan periods or since the middle of the third millennium. In the first half of the third millennium however, the same area was densely populated when water flowed perennially in the north-eastern portion of the Hakra. The choice of the upper but already abandoned course of the Hakra for new settlements during the PGW (early first millennium B.C.) period seems to have been motivated, among other factors, by the meagre but precious amount of flood water still available there from the Ghaggar with seasonal regularity.

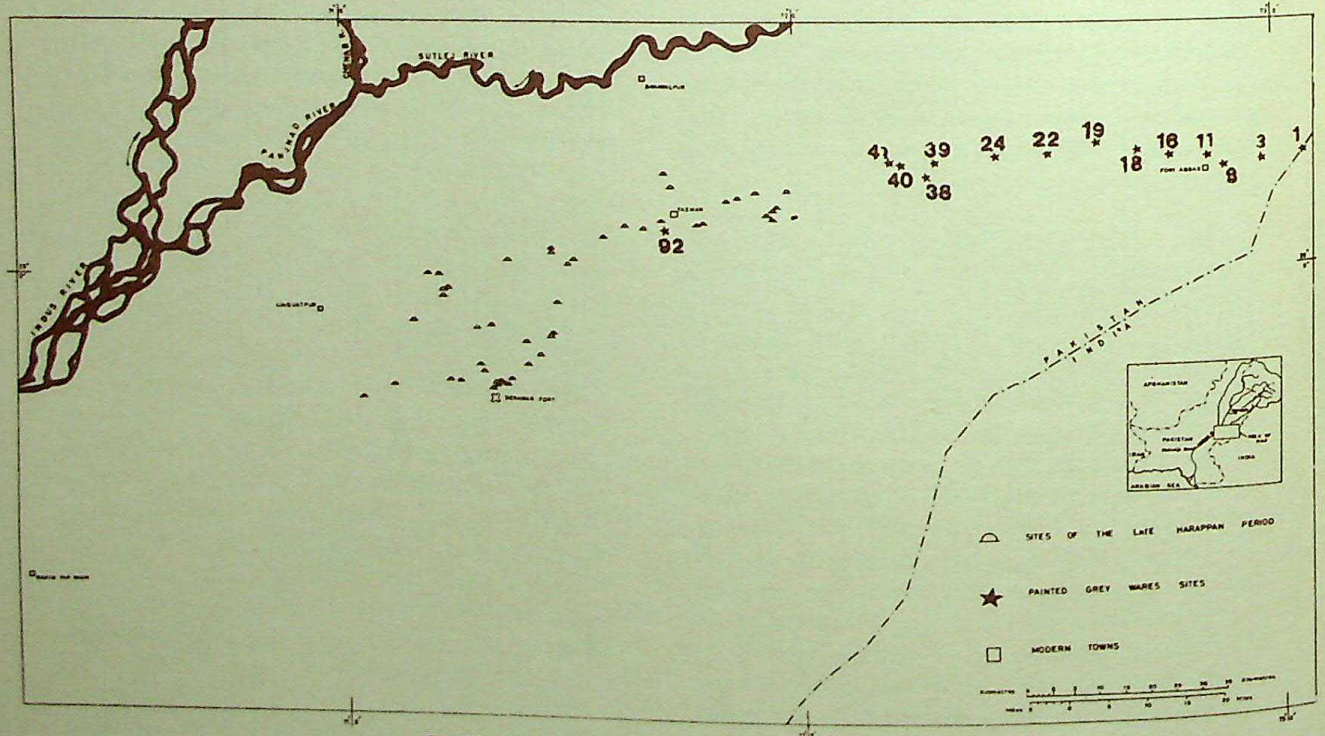


Fig.50.2. Ghaggar-Hakra: Painted Grey Ware sites

On the Late Harappan period, fifty known sites fall into distinct functional categories: 26 per cent represent camp sites; 18 per cent are purely industrial sites; 14 per cent are multifunctional sites, that is to say, settlements combined with industrial activities: and 14 per cent represent exclusively habitation sites. In sharp contrast to the situation existing in the Late Harappan period, all the PGW sites are purely settlements. Moreover, as already noted above, the PGW settlements are not only less in number but also smaller in size than those of the Late Harappan due most probably to the limitations imposed by the changed environment around the first millennium B.C. Thus, there is no comparison between the functionally articulated Late Harappan sites and those of the PGW in terms of their size and location and even cultural contents in Bahawalpur.

When only the settlement sites of the PGW and Late Harappan are compared, atleast one common feature stands out glaringly. In a sample size of 26 settlement sites of the Late Harappan period (out of 50 sites of different categories), about 46 per cent measure up to 5 hectare in size; nearly 27 per cent fall between 5 and 10 hectare; two sites (7.7 per cent) and four (15.9 per cent) cover 10-15 and 15-20 hectare area respectively. Amidst cluster of sites of different sizes, Kudwala near Yazman (Mughal 1980 and 1980a), being 38.1 hectare, is the largest known setttlement of the Late Harappan period. The existence of one large (city?) centre amidst smaller settlements (towns and villages?) is one of the conspicuous features of the Indus Civilization during its Early and Mature phases of development as evidenced in Bahawalpur, particularly where original settlement pattern has remained largely undisturbed. For example,another Mature Harappan city site,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

called Ganweriwala, sprawls over an area of 81.5 hectare among 174 contemporary sites of various categories. It is located mid way between Mohenjo-daro and Harappa. The same pattern of settlements persisted during the Late Harappan period. Likewise, during the PGW period,Satwali being 13.7 hectare in size, is the largest settlement dominating all other contemporary sites not exceeding more than four hectare in size. Whether the emergence of a large centre among smaller settlements during the PGW period reflected continuity of the Harappan tradition or a basic change in the socio-economic and political organization, is a matter of further research.

REFERENCES

Agrawal, D.P. and Kusumgar, S. 1974. *Prehistoric Chronology and Radiocarbon dates in India.* New Delhi.

Allchin, B. and R. 1968. *The Birth of Indian Civilization.* Baltimore.

Bhan, Suraj. 1973. The sequence and spread of prehistoric cultures in the upper Saraswati basin. In *Radiocarbon and Indian Archaeology.* D.P. Agrawal and A Ghosh eds. Bombay.

———. 1975. *Excavation at Mitathal (1968) and other explorations in the Sutlej-Yamuna Divide.* Kurukshetra.

Bhan, S. and Shaffer, Jim G. 1978. New discoveries in Northern Haryana. *Man and Environment,* Vol. II: 59-68.

Dalal, Katy F. 1980. A short history of archaeological explorations in Bikaner and Bhawalpur along the 'lost' Sarasvati River. *Indica* (Bombay). 17. (1): 1-40.

Dikshit, K.N. 1967. Exploration along the right bank of River Sutlej in Punjab. *Journal of Indian History,* Vol. 45 (Part II): 561-568.

Field, H. 1959. An Anthropological Reconnaissance in West Pakistan. *Papers of the Peabody Museum of Archaeology and Ethnology.* Harvard University, Cambridge. Vol. LII: 189-192.

Ghosh, A. 1953. Exploration in Bikaner. *East and West* Vol. 4 (1): 31-34.

Gupta, S.P. 1978. Introduction I. In *Mahabharat: Myth and Reality,* S.P. Gupta and K.S. Ramachandran eds. New Delhi.

Joshi, J.P. 1978. Interlocking of Late Harappa Culture and Painted Grey Ware Culture in the light of recent Excavations. *Man and Environment,* Vol. II: 95-100.

Lal, B.B. 1980. Did the Painted Grey Ware continue up to the Mauryan times? *Purāttatva,* No. 9, 94-80.

Mughal, M. Rafique. 1980. New archaeological evidence from Bahawalpur. In *Indus Civilization: New Perspectives.* A.H. Dani ed. Islamabad: 33-42.

———. 1982 *Archaeological Surveys in Bahawalpur.* Karachi. Department of Archaeology and Museums. Government of Pakistan (in press).

Shaffer, Jim G. 1980. The Protohistoric Period in the Eastern Punjab: A Preliminary Assessment. In *Indus Civilization New Perspectives.* A.H. Dani ed., Islamabad; 65-102.

———. 1980a Cultural Development in the Eastern Punjab. In *South Asian Archaeology: American Perspectives.* J. Jacobson ed. New Delhi (in press).

———. 1980b. The Indo-Aryan invasions: Cultural Myth and Archaeological Reality. Paper presented to the *Ninth Annual Wisconsin Conference on South Asia.* Madison, Wisconsin.

Stein, Sir Aurel. 1942. A survey of ancient sites along the "lost" Sarasvati River. *The Geographical Journal* Vol. 99 (4): 173-182.

Tripathi, Vibha. 1976. *The Painted Grey Ware: an Iron Age Culture of Northern India.* Delhi.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

51

F.A. Durrani

Some Early Harappan Sites in Gomal and Bannu Valleys

Ever since the discovery of Mohenjo-daro (Marshall: Mackay: 1936) and Harappa (Vats: 1940), field researchers have been actively adding to our knowledge fresh qeographical horizons of Indus Civilization, Till the time of Independence its extent was confined to the Punjab, Sind and east of Baluchistan. The Indian archaeologists deserve all the credit for extending the borders of the Indus Civilization to Saurashtra, Rajasthan, east Punjab and the Ganga valley. In the late 60's and early 70's the Department of Archaeology, University of Peshawar, contributed significantly in this respect by pushing its borders to the Pak–Afghan borderland even though Stein's survey (1929) had failed to locate any protohistoric site in this area. More than two dozen sites were revisited, besides discovering a few protohistoric sites, e.g., Hathala and Karan Shah along Dera Ismail Khan-Tank road. The following year A.H. Dani, while excavating at Gumla, added many new sites to the list, including the most important site of Rehman Dheri (fig. 51.1). In 1976 a brief survey of Farid Khan located a number of protohistoric sites in the Bannu basin. Thus the last decade has been an important one as far as the extent of Indus Civilization is concerned.

Gomal Basin: Gumla

In 1971 Dani carried out limited but very important operations at Gumla, 12km from Dera Ismail on D.I.K.-Tank Road. Through his work at Gumla he established a sequence, suggesting the existence of a pre-ceramic occupation of semi-nomadic, hut-dwelling neolithic community in

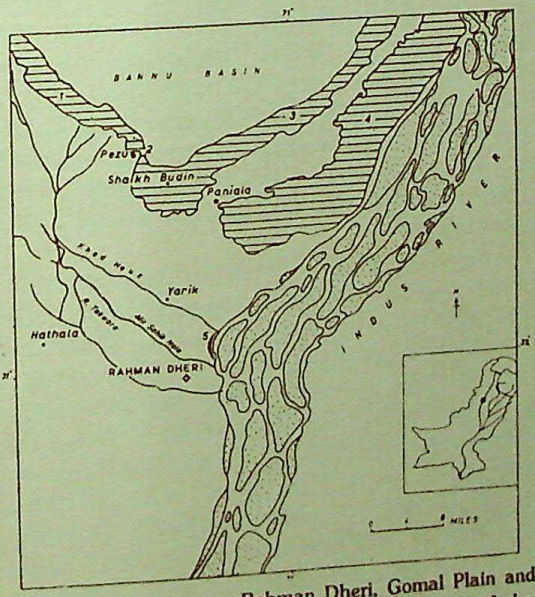


Fig. 51.1 Map showing Rehman Dheri, Gomal Plain and Bannu basin with reconstruction of the old bed of the Indus river.

period-I, followed by sedentary farmers using very fine wheel-made well decorated pottery, living in mud-brick houses (Gumla II). Gumla III represents incipient urban phase or the Kot Dijian phase (as known from its type site of Kot Diji in Distt. Khairpur, Sind). Gumla IV, according to Dani, represents the mature urban phase of the Indus, contemporary to Harappa and Mohenjo-daro. This was succeeded by Gumla V, representing the post-urban or post-Harappan phase of the subcontinent in the Gomal plain (Dani: 1971). He further suggested identification of other protohistoric sites in the Gomal valley, relating them to one or the other phase of his sequence (Shaffer:

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

1978).

Bannu Basin: Lewan

In 1977-78 a joint expedition of Peshawar and Cambridge universities carried out six weeks operations at the site of Lewan, Dre-Dares, located 23 km south of Bannu city, between the Tochi and Lewra rivers. The site covers a vast area, virtually littered with stone implements, e.g. axes, hammer-stones, grinders and lunates, leaf shaped arrow-heads or points, burins, scrapers, bead drills, blades, etc., in a variety of crypto-crystaline stones. Numerous types of finished as well unfinished heads were also recovered. Structures, if there were any, seem to have been washed away by Lewra/Tochi streams. The site revealed several pits in round, rectangular and irregular shapes, full of broken pottery, ash, charcoal, animal bones and other items of garbage. Some of these pits had large tub or basin-like storage jars. The whole site seems to represent an industrial complex (mostly of stone implements) for the area. One pit also yielded a seal impression.

The pottery mainly represents Kot Diji and Rehman Dheri II-III complex. It consists chiefly of red and buff wares with red, black, chocolate, dark brown and white paintings. Most striking examples include a dish-on-stands in dark **(fig. 51.2)** red or chocolate colour with black bands, a row of fish motifs drawn in black outline and white fillings and a large bowl in red colour with mountain goats, bulls buffalo-head with pipal leaves sprouting out between the horns. Motifs like bull, buffalo, goat and pipal leaf are known to have been important symbols in ancient mythology. These may have some bearing on the beginning of Indian iconography.

Tarakai Qila

Situated a few miles south-west of Bannu on the edge of river Tochi, Tarakai Qila guards one of the entrances to Waziristan and is the western-most limit of the proto-or incipient urban phase of the Indus. Limited work by the Peshawar-Cambridge team in 1978-79 exposed stone-and mud-brick structures with possibility of fortification at the eastern edge of the settlement. Ceramic industry was similar to the complex produced by Lewan. Considering the 14_C results, there is some possibility that Tarakai Qila may have survived till Harappan and even post-Harappan phase — an observation that has to be substantiated or modified through further research at the site.

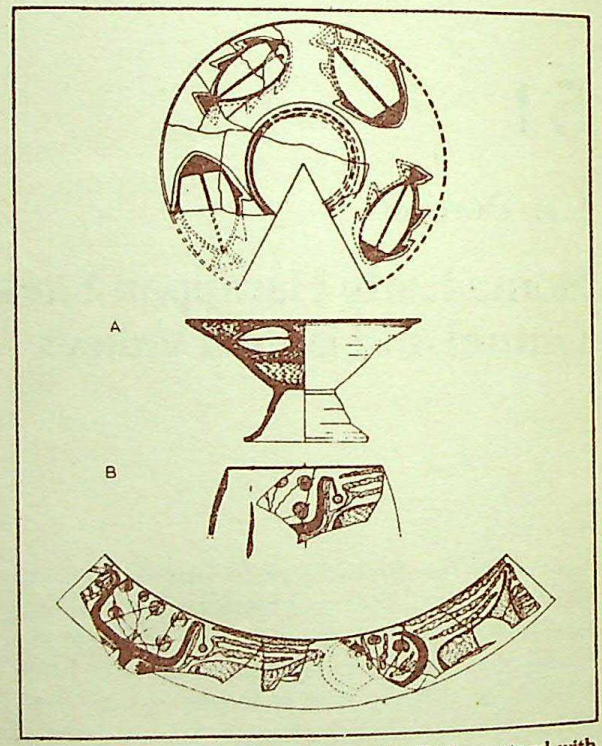


Fig. 51.2 Painted pots from Lewan: (A) Dish-on-stand with fish motif (B) Bowl with mountain goat, bull and buffalo's head, and pipal leaves.

Stone tools, beads, etc., are again similar to those found at Lewan and Rehman Dheri. A round steatite seal, with geometric carvings is the most striking find at this site.

Gomal Plain: Rehman Dheri

The most important work, west of the Indus is the one being carried on since 1976, jointly by the Departments of Archaeology University of Peshawar and Central Govt. of Pakistan under the direction of F.A. Durrani, at Rehman Dheri. The largest among the contemporary sites so far discovered in the sub-continent, 1800 × 1300 ft., Rehman Dheri is located on national grid 9054271, now about 23 km north of Dera Ismail Khan city, with latitude 31.50 N, long. 70.54 E, about a mile to the west of Dera-Bannu highway. At places it rises to 20 ft. It makes a parallelogram or rectangle amid vast and desolate Gomal plain. The plan also seems clear from the aerial photograph. The site was perhaps fortified.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Excavations

In area A, a long trench consisting of ten squares (20′ × 20′) were laid. All the squares revealed 20 layers with 4 to 5 major structural levels. The burning of some of the occupational phases is clearly visible in the sections but the nature and cause of this conflagration is still to be ascertained. The earliest occupational phase reveals round pits with mud walls. Most of these yielded large quantities of burnt wheat, barley and other grains, beside ash and charcoal. A survey of the local villages reveals that similar pits are still used as granaries with mud walls and thatched roof and with the burning of the roof, its charred debris of the contents are often recovered. Thus they may have been used for the same purpose, unlike Lewan garbage pits. The possible fortification wall built of dressed mud-slabs was traced up to 60′ in area A and was also attested at a few points around the site. In area B a large number of round furnaces were exposed. Structures (visible at the surface specially when the site is wet) consisted of mud platforms and mud-brick houses of square or rectangular shapes. The main street, exposed in area C, was about 35 ft. broad.

Pottery

The ceramic industry from Rehman Dheri is extremely rich. It is mainly red and buff wares (with some grey ware as well) and red slipped ware. It is well baked, wheel-made and of fine quality; some burnished vessels have also been recorded. The types of vessels recovered are large, medium and small storage jars, cooking pots, plates, saucer, drinking cups, vases, lids, etc. It is well painted in linear geometric pattrens. Flowers and plants, animals and birds are also there. Linear designs consist of horizontal, as well as, vertical and oblique lines and single, double or triple bands across the body. Geometric designs include triangles, squares, circles, lozenges, crosses, etc. Most interesting among them is motif showing a square connected with triangles at each end with concave arms, suggesting a stylized fish design. One such design encloses a tiny fish in the square. **(fig. 51.3/9)**

Cultural Phases

The whole sequence of Rehman Dheri can be divided in three cultural phases or periods.

Rehman Dheri I (lower), Rehman Dheri II (intermediate) and Rehman Dheri III (upper). The lower level (RHD I) represents a ceramic assemb-

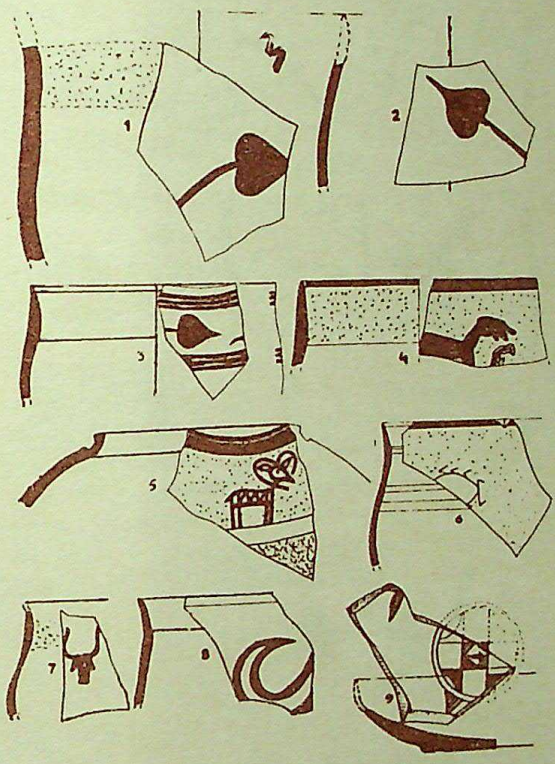


Fig. 51.3. Rehman Dheri II and III painted pottery

lage that appears to be proto-Kot Dijian. For, while some Kot Dijian elements do occur in slightly varied form, the bulk of the assemblage in the early levels is characterised by non-Kot Dijian elements. The intermediate phase (RHD II) represents typical Kot Dijian specimens with some motifs, such as pipal leaf, peacock **(fig. 51.4)**, interesecting circles and some geometric designs, typical of mature Harappan phase. The succeeding phase (RHD III) yields somewhat evolved Kot Dijian ceramic complex with more elements of continuity from proto-Harappan to Harappan period.

The Lower Level (Period I) pottery from this site yields very fine drinking cups, vases, dishes, jars, etc., in thin fabric with extremely interesting linear, geometric, plant, animal, bird and fish motifs. Geometric and linear designs remind us of Gumla II pottery. But the most interesting motif of this period is the fish depicted in black outline and white filling executed in exuberant style **(fig. 51.5)**. Such a design showing fish in X-rayed form has never been attested at any other site in South Asia. In one case **(fig. 51.5/2)** the red ware has been flaked off to make wavy bands (perhaps a river) above which the fish has been shown with three wavy lines on the body. Wavy lines are normally accepted as a symbol of flowing water in Near

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

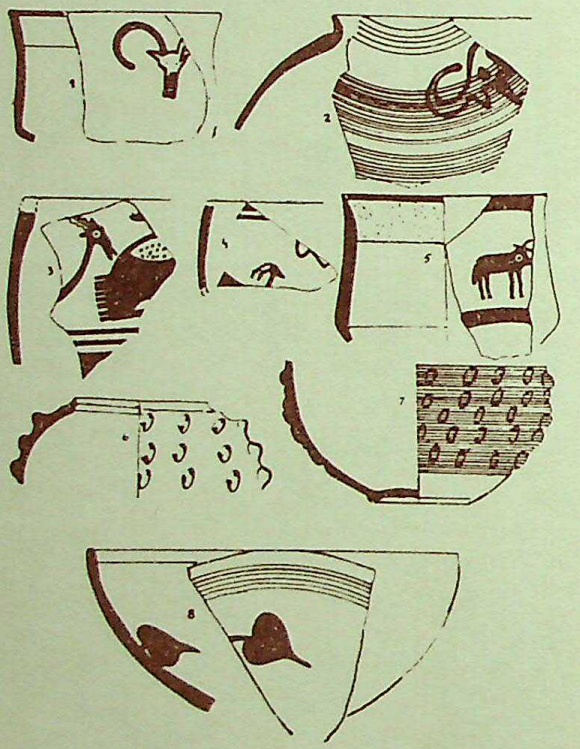


Fig. 51.4. Rehman Dheri II and III painted and knobbed ware

Eastern mythology. It is interesting to note that while fish have been shown in profile it is depicted with both the eyes, similar to those on dishes-on-stand from Lewan. The 'double eye' design is also repeated on the animals and a pipal leaf **(fig. 51.6)** from the early levels. Could this suggest the importance of double eye cult in antiquity?

In the Upper Level (period III) pottery the knobbed ware vessels **(fig. 51.4)** are of some interest. Knobbed ware vessels have been reported from middle or intermediate levels at Harappa (Vats: 1949 pl. LXXI, 14:285) and from intermediate and late levels at Mohenjodaro (Marshall: 1931, pl. LXXVII, 6:315). At both these places knobbed ware has been extremely rare and hitherto unknown from other Indus sites. Commenting on it Mackay (1936, Pl. LXVI, 54:208) remarks: "If this ware was not imported it is difficult to account for its scarcity". Mackay compares it with similar examples from Tel Asmar and elsewhere in south-west Asia. Having found this specimen in an earlier context (in one case on typical Kot Dijian grooved pot) we can suggest an indigenous evolution for knobbed ware.

Stone objects

Lithic industry from Rehman Dheri represents a

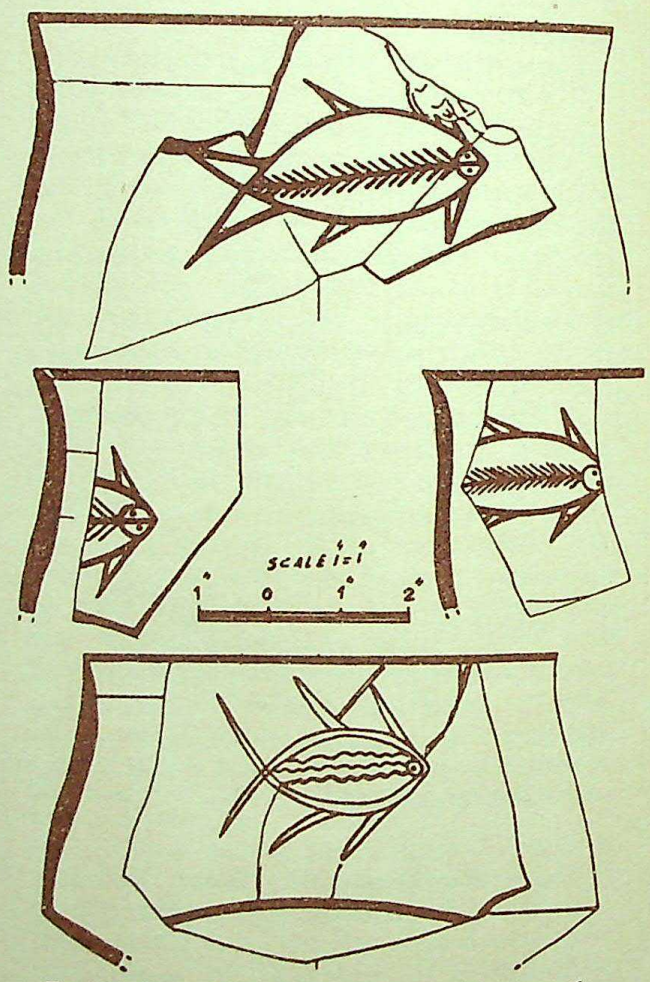


Fig. 51.5. Rehman Dheri I : Drinking cups with fish motif

variety of stone tools such as lunates, leaf-shaped points or arrow-heads, saws, scrapers, burins, blades and axes (Farid Khan: 1979). Blades from the upper level represent specimens that look

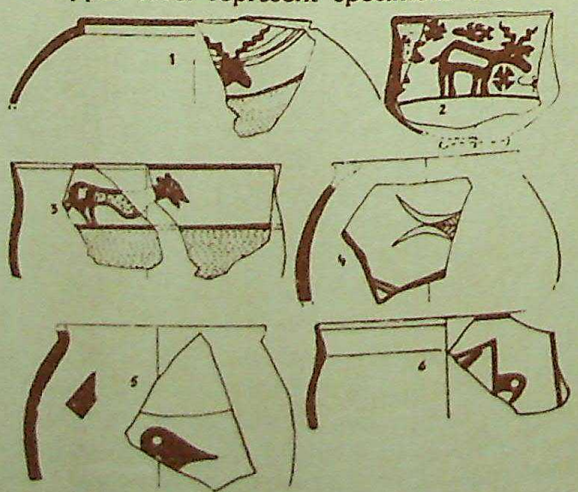


Fig. 51.6 Rehman Dheri I: Painted potery.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

closer to parallel-sided blades from the mature Indus phase. Most important of these tools seem to be bead drills. One such drill was found intact inside the attempted hole of an unfinished carnelian bead. This and a large number of unfinished beads in lapis-lazuli, turquoise, carnelian, agate, etc., along with lumps of precious and semi-precious stones in all these varieties, suggest that Rehman Dheri served as a major trade-centre for the Gomal plain. This would also imply that the beginning of long-distance trade, and the establishment of specialised crafts had already taken place long before the fully mature urban cities of Mohenjo-daro and Harappa.

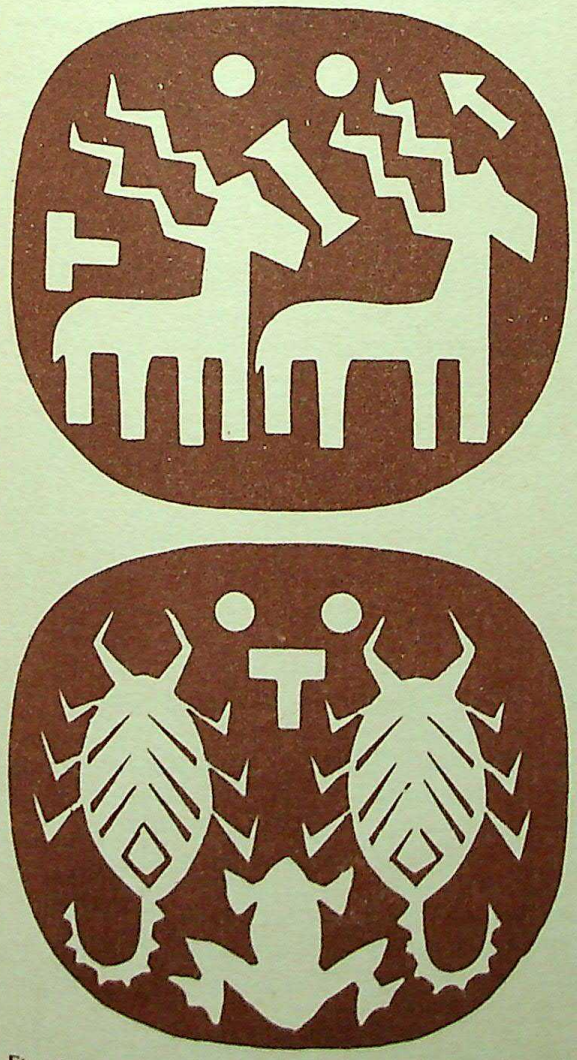


Fig. 51.7. Comparative chart of (1) Proto-Indus, and (2) Indus characters, former painted and engraved, from Rehman Dheri.

Seals

Rehman Dheri also stands unique in providing evidence of proto-Harappan seals and sealings as well as Harappan writing. From the earliest level (Period I) comes an ivory seal (**fig. 51.7**), measuring 3 × 2.7 × .02 cm. The size of the seal tends to be squarish like most of those from Mohenjo-daro and Harappa. The seal is carved on both sides showing two mountain goats and a symbol of T and I on one side, and two scorpions, a frog and T symbol on the other side. Although the animals shown on the Harappan seals are different, the symbols depicted here are those used in Harappan writing. It may be pointed out that even if the symbols were different from those on Harappan seals, the very idea of having animals along with symbols indicates an element of continuity from the proto-Harappan phase at Rehman Dheri to the mature period of Indus Civilization.

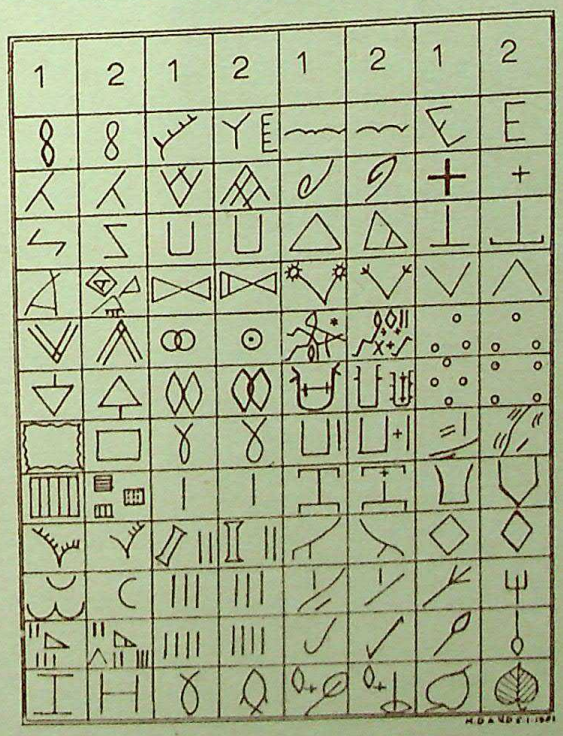


Fig. 51.8 — Comparative chart of (1) proto-Indus (painted and engraved on RHD pottery and (2) shown in Harappan writing.

Graffiti Marks on pots

A vast number of vessels from Rehman Dheri show certain symbols. These were either engraved near the bases or painted below the rims. Some examples of these also occur on the ceramics from Sarai Khola (Halim: 1972), Jalilpur (Mughal: 1974), Kot Diji (Khan: 1965), early levels of Amri

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

(Casal: 1977) and Kalibangan (Lal and Thapar: 1967) etc. and were referred to as potter's marks. From the beginning of excavations at Rehman Dheri it was suggested that perhaps these groups of symbols provided a base for Harappan writing (Durrani: 1977). A comparison of these symbols with those used in Harappan writing **(fig. 51.8)** might incline one to agree with Lal (1974, 20-24) that certain individual signs in groups of two on pottery from the proto-Harappan phase may have generic relationship with Harappan writing. One particular composite symbol may perhaps be a combination of five Harappan symbols which may suggest that writing was already taking place in the proto-Harappan period.

CONCLUSIONS

The foregoing discussion utilising evidence from the recent excavations of archaeological sites west of the upper Indus, strongly argues for a case regarding the formative stage of Indus Civilization on the Indus plain. The proto-literate and proto-urban phase is fully attested, particularly in the case of Rehman Dheri. These excavations also push the boundaries of the Indus Civilization to the Pak-Afghanistan borderland.

REFERENCES

Casal, J.M. Excavations at Amri in *Essays in Indian Protohistory,* eds. D.P. Agarwal and Dilip K. Chakrabarti (New Delhi), 1977.

Dani, A.H. 1971, Excavations in the Gomal Valley, *Ancient Pakistan,* Vol. V.

Dichter, D. 1960. *An Economic Geography of N.W. Frontier,* London.

Durrani, F.A. 1977. Rehman Dheri Excavations, Paper contributed to the IVth International Congress of South Asian Archaeology at Naples, 1977. (Now published)

Halim, A. 1972. Excavations at Sarai Khola, *Pakistan Archaeology,* No. 2, 11–85.

Khan, Farid, 1979, A Preliminary Report on the Microlithic Blade Industry from Rehman Dheri, in *South Asian Archaeology 1977.* Paper from the IVth International Conference on South Asian Archeologists in Western Europe, Naples, 1979. 375–403.

Lal, B.B. and Thapar B.K. 1967, Excavations of Kalibangan: New Light on the Indus Civilization, *Cultural Forum,* July 1964–74.

Mackay, E.J.H. 1936 *Further Excavations* at *Mohenjo-daro,* Delhi.

Marshall, Sir John, 1931, *Mohenjodaro* and the *Indus Civilization,* London.

Mughal, R. 1974. New Evidence of the Early Harappan Culture from Jalilpur, *Archaeology,* 2, 72.

Vats M.S. 1940. *Excavations at Harappa,* Delhi

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

52

J.P. Joshi, Madhu Bala & Jassu Ram

The Indus Civilization: A Reconsideration on the Basis of Distribution Maps

More field work was done in India in the domain of the Indus Civilization during the last two decades than was done during the four decades preceding it. Consequently, fresh parameters have been evolved to understand the dynamics of this civilization. Within this, one thing which is of basic importance for all archaeologists concerned with Indus studies is the preparation of a perfect cultural atlas. The present authors, in the meantime, have prepared seven distribution maps **(fig. 52. 1-7)** showing sites of the Indus Civilization in India. This has been done after careful examination of not only the published material but also unpublished material by visiting doubtful sites, re-examining the explored antiquities in universities and other places and computing exact longitude and latitude of each site **(Chart 1).**

By now more than seven hundred pre-Harappan, Harappan and late Harappan sites have been discovered in India. The area of distribution of Harappan settlements runs broadly from Manda in southern Jammu (J&K) through Diamabad in northern Maharashtra and, Mehgam and Bhagatrav in southern Gujarat, Hulas in District Saharanpur in western U.P. It covers an area of 1.3 million sq. km. **(fig. 52.1).**

The excavated sites of the above cultures have yielded substantial number of radiocarbon dates. When calibrated (MASCA) the dates of Harappan culture range between 2900 B.C. and 1900 B.C.

INDUS CIVILIZATION: THREE STAGES

The detailed analysis of the pre- (or Early) Harappan pottery in India is based on our knowledge of the pottery from Kalibangan which has been broadly divided into the following six fabrics (Thapar 1975: 21).

Fabric A: is carelessly potted, red to pinkish in colour, painted with black, sometimes,in addition, with white, over a dull red surface having a variety of designs.

Fabric B: is distinguished by red slip applied upto the shoulder, and having a rusticated lower portion.

Fabric C: is marked by fine textured paste and a smooth purple and plum red slip designs in black.

Fabric D: is characterized by deeply incised designs, sometimes along with black painted motifs.

Fabric E: comprised vessels with buff or reddish slip having designs in black.

Fabric F: a thick grey coloured pottery.

The other materials associated with this complex are some simple copper objects, terracotta cakes and objects of semi-precious stones. This complex is known also as 'Sothi' after the type site.

The Harappan pottery, on the other hand, is characterized by well fired red wares, painted with black designs of vegetal and geometric patterns, such as pipal leaf, banana tree, landscape, fish-scale, concentric circles, intersecting circles, etc. The major shapes include dish-on-stand, 'S' shaped jars, straight sided beakers, pointed goblets, perforated jars, etc.

The other antiquities included in this complex are tubular and other beads of semi-precious stones and faience, terracotta cakes, inscribed seals and sealings, cubical weights and measures,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

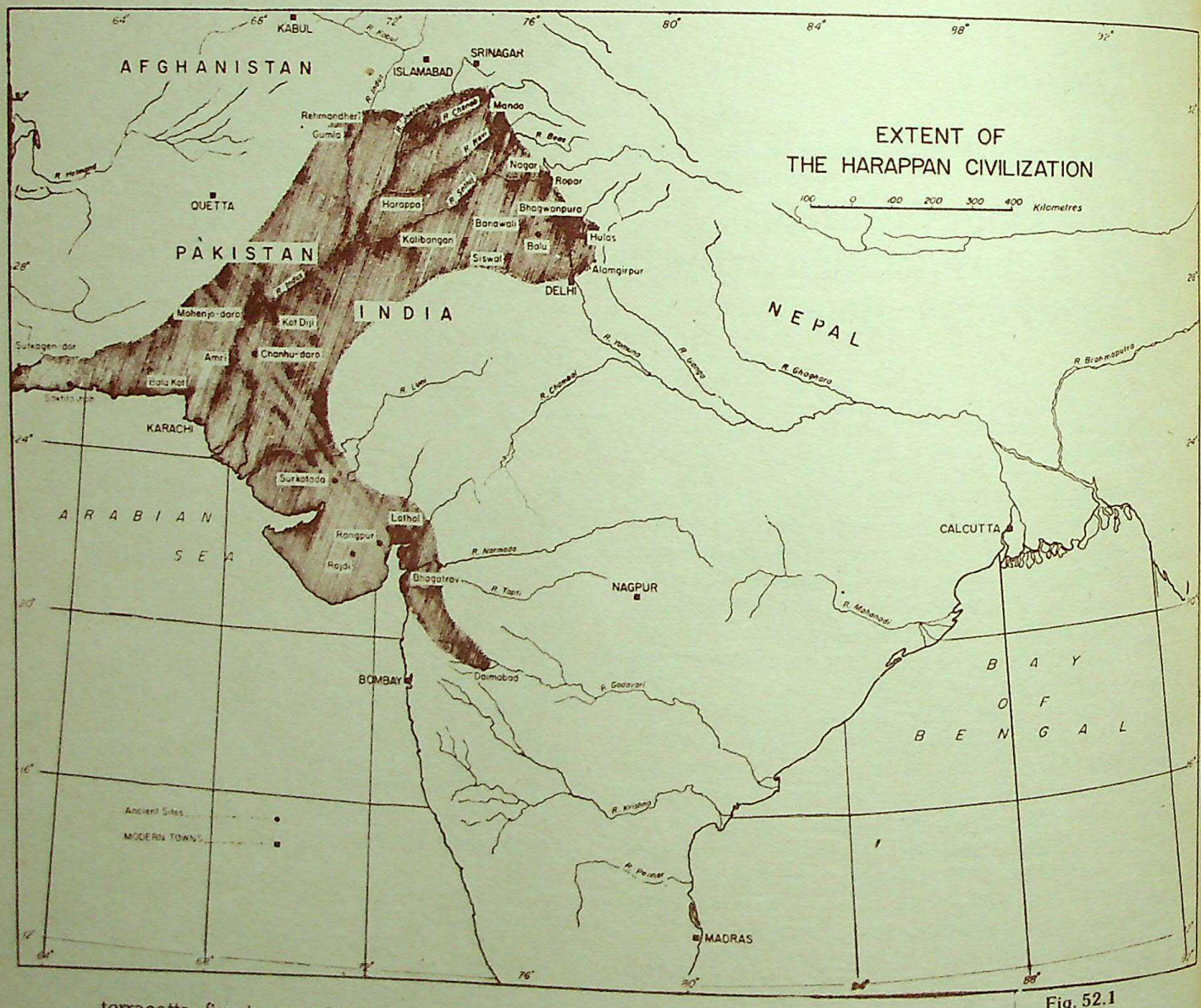


Fig. 52.1

terracotta figurines, gold and silver ornaments, copper-bronze implements, etc. We need not elaborate it since it is elsewhere widely listed (Joshi 1982).

The term late Harappan is now widely used but little understood or variously understood. The reason is not far to seek. The term has time concept: it represents the late stage in the life-span of the Harappan Culture, and it usually stands for the post-urban stage of this culture. It covers the second millennium B.C. and in its scope fall several regional variations of the post-mature Indus Civilization. Hence we are using small 'l' in 'Late'. Thus, in Gujarat the late Harappan is characterized by Lustrous Red Ware Complex: in Sind by Jhukar Complex; in Maharashtra by Daimabad Complex; in Bahawalpur and parts of northern Punjab, by Cemetery 'H' Complex; in central Haryana by Mitathal B Complex; in the Punjab and Haryana by Late Bara Complex; in upper Ganga-Yamuna doab, by Hulas Complex; and in Yamuna-Hindon basin, by Alamgirpur Complex. Each culture-complex is different from the other, in pottery as well as in many other associated cultural items. And yet all of them share some mature Indus elements, such as a few inscribed seals and sealings or potsherds, faience, agate and cornelian beads and bangles; a few terracotta cakes, balls and bangles; a few thick and sturdy pottery types and painted designs, and even

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

copper-bronze objects. Negatively, there was a complete disregard for monumental structures, people lived in huts or mud or mud-brick houses in sites 1 to 2 hectare in extent, generally located on the banks of small rivers.

This short explanation about late Harappan is essential because of the prevailing confusion regarding its nature. It is necessary to remember that the term 'late Harappan' does not represent a homogeneous culture-complex; it represents only the devolutionary stage of the Indus Civilization in a variety of manifestations, the character of which is dependent on the character of the mature Harappan complex of which it is the devolutionary stage.

GANESWAR CULTURE

In recent years a large number of sites yielding hundreds of copper-bronze tools and weapons, some microliths with apparently pre- or Early Harappan pottery, including 'Reserved Slip Ware', and some OCP (Sapai Complex) strap-handled pots, have been found at and around Gane–swar in the Khetri mines area of northern Rajasthan. The excavators have called it 'Gane–swar Culture' (Agrawala and Kumar 1982: 125) and we have retained this term, since except for the fact that it may be dated to the third millennium B.C. not much is known about it. Our maps include the distribution of sites of this culture too.

The maps show sites of all the four complexes. A number of sites have been explored and excavated by our team. Some of the conclusions drawn are as under.

The Indus Civilization was the culmination of a long process of cultural configuration that was going on through several millennia in the geographical tract lying between the hills of Baluchistan and the Ghaggar basin. The culmination, or change from the pre- (or Early) Harappan to mature Harappan, seems to have taken place in the Ghaggar or Saraswati basin, although some scholars still look towards the Baluchi peidmont region for the origin of the mature Indus Civilization. The distribution maps show quite clearly the concentration of the Indus sites with pre- (or Early) Harappan material overlaid with mature Harappan material in the basins of the Ghaggar or Saraswati and its tributaries. It is for this very reason that S.P. Gupta (Gupta 1983) suggests that instead of persisting with the older title, the Indus Civilization, we might as well call it 'Saraswati Civilization' or 'Saraswati Culture'.

ECONOMIC POCKETS

The maps of the Indus sites also show that there were pockets in Punjab, Haryana, Rajasthan and Bahawalpur in which sites were concentrated (Joshi 1982 b). We have called them 'Economic Pockets' since we feel that 'area concentration' was the outcome of a process in which subsistence self-sufficiency was achieved by a closely-knit inter-dependent sites. Ghaggar or Saraswati also provides good evidence for it. It may be made clear that the 'gaps', or comparatively thinly populated areas between two 'pockets', are not due to any oversight or limited exploration; these areas were more or less thoroughly explored, but these gaps do appear to exist in reality. Between 1975 and 1980, the authors explored the districts Amritsar, Gurdaspur and Jullunder which yielded only the late Harappan sites (Joshi & Madhubala 1981: 64-65; Madhubala 1978: 112-118). But the area now covered by districts Ropar and Patiala have yielded Harappan and pre-Harappan sites. Significantly, except for the mature Harappan site of Manda on the Chenab, no other pre-Harappan site has been found so far on the Chenab and Beas. We then proceeded to district Bhatinda and also followed the dried up tributaries of the Ghanggar in the Mansa Tehsil. Twenty one pre-Harappan-cum-Harappan sites were located, some of which are indeed very large. These sites have yielded both the pre-Harappan and Harappan pottery and antiquities. The explorations carried out earlier by the Archaeological Survey along the Ravi, Beas and Sutlej did not yield such huge sites with pre-Harappan and Harappan deposits. Since the explorations have yielded Harappan sites in the southern area of Bhatinda District in Punjab, adjoining Sriganganagar District of Rajasthan, it appears that the established channel of movement was between northern and southern Punjab (Joshi 1982 b: 8-9). A large number of pre- Harappan and Harappan sits were located earlier in District Patiala in Punjab and District Hissar in Haryana which neatly connect our newly discovered sites and uphold our theory of 'economic pockets'. **(fig. 52.9).** The late Harappan sites, on the other hand, are largely located on small rivers in north-western Ganga-Yamuna doab and parts of

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Haryana. Their number is also larger than the number of mature Harappan sites **(fig. 52.7,8)**.The inference appears to be simple: when the Harappan cities collapsed, they, in the very nature of things, gave forth larger number of villages The same thing happened in Gujarat — there also, according to Possehl (1980), the late Harappan sites are larger in number than the Harappan sites **(fig. 52.4)**. Secondly, with limited resources available in villages, the late Harappans were not in a position to defend their settlements on large rivers. They, therefore, chose to live along the small tributaries of larger rivers.

The late Harappan Culture seems to have continued till the Painted Grey Ware Culture. Evidence of this kind has been recorded in surface collections made in Bahawalpur region by Mughal (1982). In fact, our excavations at Bhagwanpura and Dadheri have yielded clear stratigraphic evidence of overlap between the late Harappan and the PGW Culture (Joshi & Madhubala 1982: 191 ff). There is, therefore, no cultural break or gap between the Harappan and post-Harappan traditions.

Ganeswar appears to be a distinct complex. Its people were hunters and fishers, living largely in the catchment area of the rivers Kantli and Dohan **(fig. 52.5)**. They were also great smiths and, according to R.C. Agarwal (1982), they are likely to have supplied metal objects to the people of Kalibangan and other Harappan sites. For the present we feel that as a cultural entity, it was highly localized although it does not appear to have originated and developed in isolation—it had trade and cultural contacts with other contemporary cultures around its area of concentration. But at the present state of research it is not possible to give details of these contacts.

Gujarat sites present their own problems since a number of mature Harappan sites in Districts Kheda and Mehsana are very small, yielding the evidence of seasonal occupation of semi-nomadic people. Sites somewhat similar in nature have also been recorded by M.R. Mughal (1982) on the Ghaggar in Bahawalpur region. Thus, while classifying the sites, we have used the criterion of cultural material and not the size of the settlement. Fortunately, the explorers in this region have recorded the nature of the explored material quite faithfully (Possehl 1980: 81-86). While exploring and excavating the Indus sites in Kutch, it was hypothesized that the mature Harappan people entered into Gujarat directly from Sind via Kutch, following the land route (Joshi 1972: 143). The distribution map makes this amply clear **(fig. 52.2)**. It, therefore, revises the theory of S.R. Rao according to whom they came along the sea-coast. As the maps would show, the coastal sites are, by and large, late Harappan and not mature Harappan. The excavations at Surkotada by the senior author (Joshi 1972) and at Desalpur by K.V. Soundararajan (elsewhere in the Volume-eds.) present cultural details which go a long way to establish our theory. The maps also show that both the Thar desert and the Himalayas were avoided; except for a couple of sites functioning as out-posts, there is no Harappan site in the mountains. In Pakistan also the interiors of the Baluchi hills were avoided. Thus, these maps help us in formulating many ideas whose validity can hardly be proved otherwise.

The Emerging Picture

The picture that emerges from the above mentioned data shows that the pre- or early Harappans were closely followed by the Harappans and significantly enough on the same sites; there is rarely a separate settlement of the pre-Harappans in the Punjab. However, there are separate settlements of the Harappans, a fact which shows that the change in culture from the pre-Harappan to Harappan took place locally.

The availability of twenty one sites in an area of approximately 50 km × 25 km (i.e. 1250 sq. km.) in Mansa taluk of district Bhatinda shows that this area was a very important zone in the Harappan culture-area. The pre-or early Harappans and Harappans preferred the Ghaggar and its tributaries as this was a more static river system than the Beas, Sutlej and Ravi which were erratic in their behaviour, changing their courses very often **(fig. 52.6)**. The Sirhind, a tributary of the Ghaggar, was one of the most important lines of communication between Punjab and Rajasthan; vitally important for getting raw material like timber, especially deodar used in house-building activities, as noted earlier. This channel appears to be buzzing with activity in the third and second millennia. Studies of the settlement pattern of the area suggests that it had three types of settlements: (1) Cities, of about 1500 × 1500 m area, such as Dhalewan, Gurnikalan, Baglian Da Theh, Lakhmirwala and Hasanpur. These are generally

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

ANCIENT SITES ALONG
THE HAKRA RIVER BED IN BAHAWALPUR

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

situated at a distance of 3 to 5 km from each other (2) In between there appears to be six towns also, ranging in area between 900 × 900 m and 500 × 500 m at Karampura, Dallewala I, Sahnewali, Hirke, Dallewala II and Baran II. It has been observed that all the cities and towns were situated on the eastern side of the river where denudation by floods was less, while (3) a series of villages, numbering 14, covering approximately an area of 200 × 200 m. to 400 × 400 m. sites like Danewala I, Danewala II, Chhoti Mansa, Lallianwali, Lal Bhikhi, Gurni Kalan II, Nebriwala, Naiwala I to V are situated on the western side which was subjected to occasional floods. At present also big cities on the Yamuna are situated on the southern side of the river where the thrust of floods is lesser. This area, therefore, gives the best evidence of all the three types of settlements placed near each other, creating an ideal situation of an urban complex. Their commercial interaction was the prerequisite for a developed civilization. It seems that Sirhind was an important 'economic pocket' which mobilized the resources of the northern region of the lower Himalayas and transported them to Bahawalpur area via Kalibangan, and also to Harappan sites in Haryana and Punjab. The situation is almost the same which exists in Kutch which was a half-way house with a concentration of as many as 25 sites between Sind and Gujarat. It may be pertinent to mention that there was yet another 'economic pocket' on the same Ghaggar in the Bahawalpur region where M.R. Mughal has located about 400 Early Harappan and Harappan sites in an area of 1000 sq. km. from Yazman to Derawar For **(fig. 52.3)**. We summarise our findings as under:

(1) The Ghaggar was a mightier river than the Indus with its own net-work of tributaries along which lay hundreds of sites with at least three 'economic pockets': one, northern—along Sirhind and Saraswati; second, central—in Bhawalpur area, and the third, southern—in Kutch.

(2) pre- or early Harappan and Harappan settlements were largely located along the major and perennial rivers. This was obviously due to the fact that urban phase of the civilization had the technological capabilities to thwart the onslaught of the seasonal and occasional floods by creating high defences and platforms.

(3) The explorations have clearly established the fact that due to the erratic behaviour of the Ravi, Beas and Satluj the Harappans did not prefer their banks for their settlements, except occasionally. Therefore no Harappan site is available between Manda and Ropar although the area has been subjected to intensive exploration. However, it appears that during the late Harappan times preference for settlements on the tributaries of those major rivers gained impetus. Due to economic poverty and population shrinkage, they were unable to maintain protection platform and, therefore, moved to the tributaries in higher regions, towards the north where water was still available and the danger of flood was of a comparatively lower magnitude. This was almost the same in western U.P. where during the late Harappan times the tributaries of the Yamuna, such as the Krishni and Hindon in the districts of Saharanpur and Bulandshahar, were favoured for a large number of their settlements. The same situation is met with in Gujarat. It appears that this phase of late Harappan culture emerged at some point of time when people were inhabiting Mansa region in district Bhatinda as attested to by six late Harappan sites. Significantly, this stage is not found in Rajasthan. It has also been observed that the concentration of late Harappan sites is more in the upper region, most probably due to the fact that this movement brought them nearer to the less-flooded regions, as noted earlier.

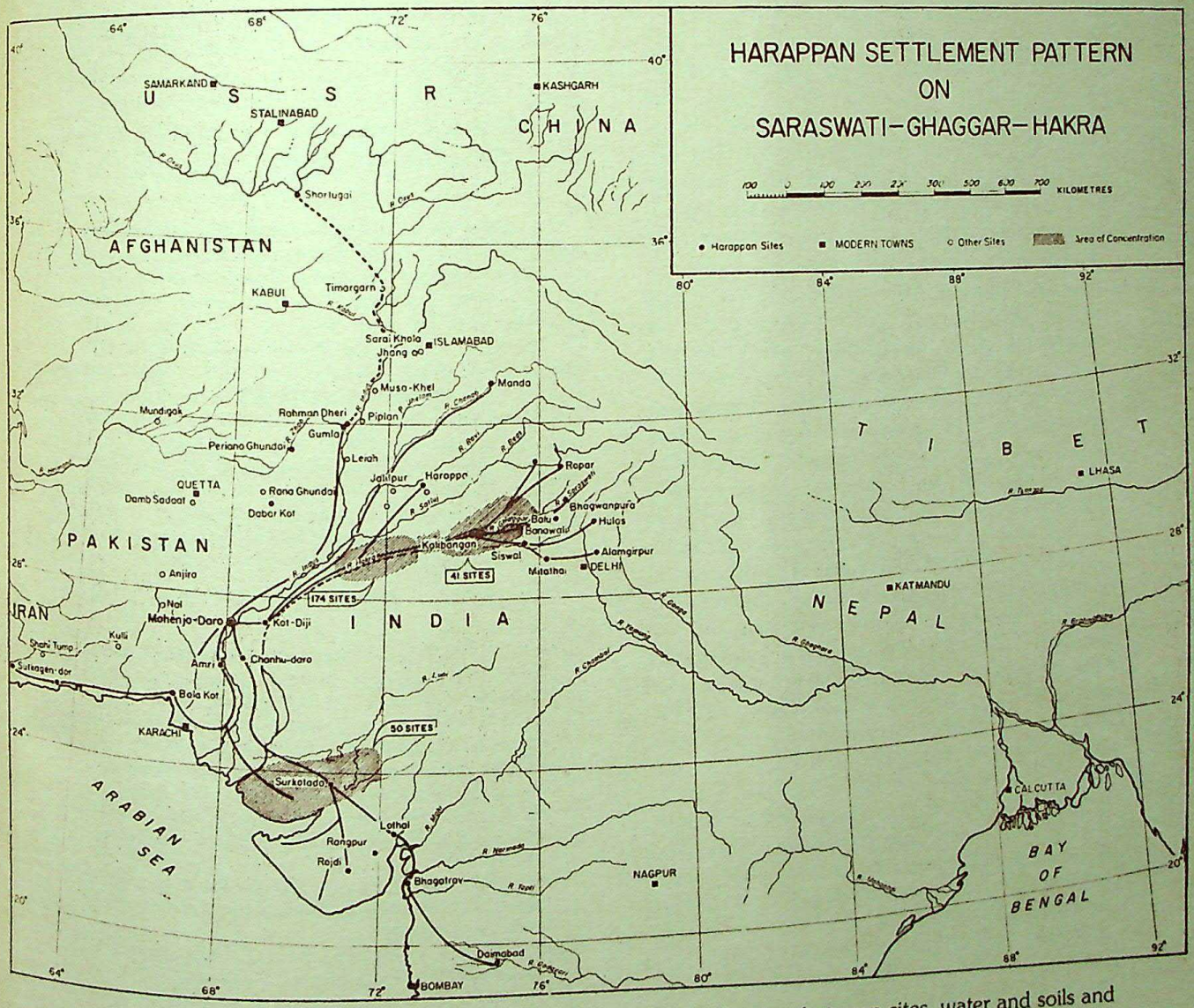
(4) The present study has also revealed the eastward movement of the late Harappans in Punjab, Haryana and western U.P. This feature is borne out by the increase in frequency of sites while moving from the west to the east.

(5) It has also emerged from the present survey that Baran element having pre-Harappan lineage has its dispersal only with late Harappan sites in the upper Punjab and Haryana, and it is totally missing in the southern region. This may perhaps indicate that Barans had more intimate cultural contacts with late Harappans during their second phase of existence in the upper Punjab region.

(6) It has also been observed that a type of incised red ware having varied designs with pre-Harappan lineage is met with in considerable quantity in all the late Harappan settlements in Punjab and Haryana.

(7) Though the element of Cemetery 'H' red ware is present in some of the late Harappan settlements in the Punjab and Haryana, no exclusive settlement of Cemetery 'H' is available. In fact, the users of Cemetery 'H' pottery had their settlements confined to Montgomery (Harappa)

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



and Bahawalpur areas of Pakistan and did not substantially occupy eastern Punjab and Haryana in India. The stray finds may suggest only contact.

In all, there are about 200 sites of Harappan and late Harappan cultures in Gujarat. While Lothal, Surkotada and Desalpur have already shown a glimpse of matured phase of Harappa Culture, generally sites show a long survival of Harappan settlements and traditions. The sites in Kutch and northern Saurastra show the route of movement. Essentially, the riverine character of the settlements is clear but the hinterland where dry farming had possibilities was also exploited in the late Harappan times. As Possehl (1980) has rightly pointed out "the particulars of the Gujarati Harappan site distribution over time and space, the association between sites, water and soils and the dry farming are all significant in terms of the large picture of settlement and adaptation within a peripheral region of the civilization." Kanewal and Dhatva and a large number of sites in Saurastra and Gujarat which are late Harappan and rural sites tend to further attest the rural pattern of Harappan culture and its diffusionary process. It has been also seen that in the region of Kutch the mounds are larger in comparison to the mounds in Saurastra area of Gujarat indicating larger and thicker habitation deposits. The Harappans who reached Daimabad had the typical late Harappan pottery, Indus script, cakes, burials, etc. and at present it is the southern-most limit of the culture.

In Conclusion, it may be stated that within the

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

domain of the Indus Civilization the evidence from Mansa Taluk of District Bhatinda for the first time provides an important aspect of settlement pattern of the Indus Civilization: that there were 'economic pockets' with close circuits of villages, towns and cities in compact areas of Haryana, Punjab, Bahawalpur and Kutch. Such 'pockets' have their own role to play in our understanding of the settlement pattern of the eastern Harappans. Hydrological changes affecting adversely the availability of water in the middle and lower course of the perennial river systems like the one we observe in the Ghaggar-Saraswati, made the Harappans leave their settlements and break their urban fabric for ever. In the wake of these two phenomenae lives the fragmentation of cities, both demographically and qualitatively. No wonder, the number of late Harappan sites registers manifold increase but in non-urban context of smaller and shallower settlements located much closer to each other than earlier. The movements of the late Harappans favour areas in the northern parts of present states of Punjab, Haryana and northern U.P. and hinterlands of Saurastra since in these regions the older river systems still retained water, and dry farming was also practised. Not only that, the directional changes in the settlement pattern from the Harappan to the late Harappan has been from the west to the east and from the major river valleys to the tributaries in north India. During the Painted Grey Ware times, some of the old major rivers were again favoured since it appears that due to geological reasons once again the middle courses of the rivers like the Ghaggar, Saraswati and Drishadvati became active, albeit limitedly. Still the direction of movements remained the same: from the west towards the east. However, two new areas were occupied — that Palaeo-Yamuna channel in the Bharatpur district of north-eastern Rajasthan (Gupta *et al* 1977) and the Ganga system in north eastern U.P. The extension was more or less in the same region where once the Copper Hoards and/or the Ochre Coloured Pottery proliferated **(fig. 52.9)**.

The conclusions arrived at, and the sites plotted in the maps are based on the data available at present. Further explorations will undoubtedly bring to light new Harappan sites. But this may not radically alter the directional changes of the Indus Civilization as indicated by these maps.

ACKNOWLEDGEMENTS

The authors are grateful to the Director General, Archaeological Survey of India, for making possible the above study and also permitting us to publish it. Grateful thanks are due to Drs. U.V. Singh and Suraj Bhan of Kurukshetra University, Dr. Silak Ram, Dr. Amar Singh, Dr. Manmohan Kumar, Dr. Dharam Pal Punia and Dr. Brahm Dutta S/Shri G.B. Sharma, P.K. Saran, Shankar Nath, K.N. Dikshit, R.P. Sharma, Dr. C. Margabandhu and Dr. K.T.M. Hegde and Prof. R.N. Mehta, Dr. G. Possehl, Ms. Marcia Fentress and Shri S.R. Rao. The authors owe a deep debt of gratitude to Shri S. Chatterjee and Vijay Kumjar for assisting Shri Jassu Ram Batra. Dr. S.P. Gupta has been of considerable help in going through the manuscript. Grateful thanks are also due to Shri. G. Laxminarayana for providing help and assistance in many ways, and to Shri O.N. Rattan for typing the manuscript.

REFERENCE

Dalal, K.F. 1980. A Short History of Archaeological Explorations in Bikaner and Bahawalpur along the 'Lost Saraswati' River, *Indica*, 17, No. 1, 4–40.

Dikshit, K.N. 1980. A Critical Review of the Pre-Harappan Cultures, *Man and Environment*, Vol. IV, 32–43.

——— 1979. Old Channels of the Ghaggar in Rajasthan—Revisited, *Man and environment*, Vol. III, 105–106.

Ghosh, A. 1965. The Indus Civilization: Its origin, authors, extent and chronology, *Indian Prehistory:* 1964, Pune, 113–156.

——— 1952. The Rajputana Desert—Its archaeological aspect, *Bulletin of the National Institute of Sciences of India*, No. 1, 37–42.

Gupta, S.P. 1978. Origin of the Form of Harappa Culture: *A New Proposition, Puratattva*, No. 8, 141–46.

——— 1972. In Omi Manchanda's *A Study of the Harappan Pottery*, New Delhi. Appendix.

Lal, B.B. 1980. Kalibangan and the Indus Civilization, *Essays in Indian Protohistory*, D.P. Agarwal and Dilip K. Chakrabarti, ed., New Delhi, 65—67.

Mughal, M.R. 1975. the Early Harappan Period in the Greater Indus Valley and Northern Rajasthan, *Microfilm, Michigan University*, USA, 95–123.

Stein, A. 1943. an Archaeological Tour along the Ghaggar-Hakra. River, 1940–42, *Microfilm, American Documentation Institute, Library of Congress*, Washington, USA.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Chart 1

INDUS SITES : LIST

STATE : HARYANA
PERIOD (PRE-HARAPPAN)

DISTRICT. KURUKSHETRA

S.No.	SITES	COORDINATES
1.	Barsana	29°40′N – 76°35′E
2.	Ratta Khera Khuram	30°07′N – 76°27′E

DISTT KARNAL

3.	Dachor	29°40′N – 76°42′E
4.	Gagsina	29°34′N – 76°53′E
5.	Kamalpur	29°33′N – 76°54′E
6.	Lohari	29°22′N – 76°50′E
7.	Saunkhra-3	29°47′N – 76°53′E
8.	Shahpur	29°14′N – 76°49′E
9.	Singhra	29°42′N – 76°50′E
10.	Urlana Khurd	29°22′N – 76°43′E

DISTT. JIND

11.	Amargarh	29°37′N – 76°01′E
12.	Baghru Kalan	29°18′N – 76°36′E
13.	Balu	29°40′N – 76°22′E
14.	Bata (Rani Ran)	29°43′N – 76°19′E
15.	Barsana - 2	29°22′N – 76°25′E
16.	Buwana - 2	29°12′N – 76°18′E
17.	Daroli Khera	29°29′N – 76°06′E
18.	Davera	29°05′N – 76°22′E
19.	Dhakal	29°35′N – 76°10′E
20.	Dhanouri	29°47′N – 76°11′E
21.	Dhumarkha Kalan - 1	29°33′N – 76°09′E
22.	Dhingana	29°13′N – 76°26′E
23.	Ghatoli	29°11′N – 76°23′E
24.	Ghimana	29°15′N – 76°18′E
25.	Gunkali	29°17′N – 76°13′E
26.	Hatho	29°38′N – 76°11′E
27.	Jhamola	29°08′N – 76°20′E
28.	Jind (Jind-Bir-Band-Ban)	29°19′N – 76°19′E
29.	Kachhana Kalan	29°29′N – 76°18′E
30.	Kalait	29°40′N – 76°16′E
31.	Kandela - 2	29°23′N – 76°20′E
32.	Karela - 2	29°08′N – 76°19′E
33.	Karsola - 2	29°09′N – 76°26′E
34.	Kathana - 2	29°33′N – 76°22′E
35.	Kharak Pandwan	29°40′N – 76°17′E
36.	Kharal - 1, 2	29°42′N – 76°03′E
37.	Khema Kheri	29°13′N – 76°23′E
38.	Koel	29°45′N – 76°11′E
39.	Laun	29°40′N – 76°02′E
40.	Mangalpur	29°31′N – 76°04′E
41.	Manoharpur	29°21′N – 76°24′E
42.	Morkhi	29°17′N – 76°32′E
43.	Moana	29°26′N – 76°34′E
44.	Nand Garh	29°11′N – 76°28′E
45.	Nidani	29°15′N – 76°25′E
46.	Pahlwan	29°29′N – 76°12′E
47.	Pauli	29°05′N – 76°28′E
48.	Pinju Pura	29°39′N – 76°12′E
49.	Pipal Theh — 1	29°45′N – 76°05′E
50.	Radhana	29°16′N – 76°22′E
51.	Sedha Majra	29°29′N – 76°08′E
52.	Siamlo Kalan — 1, 2	29°12′N – 76°23′E
53.	Ujhana	29°42′N – 76°08′E

DISTT. SONIPAT

54.	Chhapra	29°07′N – 76°32′E
55.	Garhwal	29°11′N – 76°32′E
56.	Rindhana	29°07′N – 76°30′E
57.	Rookhi	29°03′N – 76°41′E

DISTT. ROHTAK

58.	Badli	28°35′N – 76°48′E
59.	Badsa	28°30′N – 76°51′E
60.	Baliana	28°53′N – 76°43′E
61.	Sanghi	29°02′N – 76°37′E
62.	Sisana	29°56′N – 76°51′E

DISTT. BHIWANI

63.	Mitathal	28°52′N – 76°11′E
64.	Tigrana	28°50′N – 76°09′E

DISTT. MAHENDARGARH

65.	Dadri	28°35′N – 76°16′E
66.	Manhairu	28°43′N – 76°14′E

DISTT. GURGAON

67.	Alduka	28°06′N – 77°06′E
68.	Gokulpur	27°48′N – 77°07′E
69.	Luhinga Kalan	27°50′N – 77°08′E
70.	Mamlika	27°55′N – 77°08′E
71.	Mandkaula	28°08′N – 77°10′E
72.	Mundetha	27°55′N – 77°08′E
73.	Papra	27°54′N – 77°08′E
74.	Sultanpur	27°56′N – 77°08′E

DISTT. HISSAR

75.	Alipur Kharar - 1,2,3,	29°08′N – 75°53′E
76.	Banawali	29°36′N – 75°25′E
77.	Bani	29°35′N – 74°35′E
78.	Barki	29°17′N – 75°46′E
79.	Bhirrana	29°32′N – 75°32′E
80.	Chanat - 1,2,3	29°14′N – 75°55′E
81.	Chimun	29°40′N – 75°40′E
82.	Datta	29°15′N – 76°00′E
83.	Garhi	29°04′N – 76°07′E
84.	Ghaswa	29°41′N – 75°41′E
85.	Gular Wala	29°43′N – 75°46′E
86.	Hansi	29°05′N – 75°59′E
87.	Lohar Rago	29°16′N – 76°04′E
88.	Matar Sham	29°10′N – 75°35′E
89.	Mirch Pur	29°18′N – 76°11′E
90.	Pali - 1, 2	29°08′N – 76°05′E
91.	Patan	29°05′N – 75°39′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

92.	Rakhi Garhi	29°17′N – 76°07′E
93.	Rakhi Shahpur - 1, 2	29°17′N – 76°07′E
94.	Ratta Theh	29°44′N – 75°45′E
95.	Masaud Pur	29°14′N – 76°00′E
96.	Salim Garh	29°10′N – 75°32′E
97.	Satrod Khurd - 1, 2, 3	29°06′N – 75°47′E
98.	Shahpur	29°09′N – 75°36′E
99.	Singhwa	29°02′N – 76°17′E
100.	Sisai	29°10′N – 76°00′E
101.	Siswal	29°13′N – 75°30′E
102.	Talwara	29°45′N – 75°40′E
103.	Theraj (Chakko)	29°44′N – 75°08′E

STATE: PUNJAB
PERIOD (PRE-HARPPAN)

DISTT. KAPURTHALA

1.	Domeli	31°20′N – 75°46′E
2.	Karalan	31°23′N – 75°22′E

DISTT. ROPAR

3.	Kotla Nihang	30°56′N – 76°32′E
4.	Ropar	30°58′N – 76°31′E

DISTT. SANGRUR

5.	Bhudan	30°31′N – 75°46′E
6.	Jandali	30°38′N – 75°51′E
7.	Mahorana	30°29′N – 75°57′E
8.	Rohira	30°38′N – 75°50′E
8A.	Kalian	30°35′N – 75°43′E
8B.	Moholi	30°38′N – 75°45′E

DISTT. LUDHIANA

9.	Chandiala	30°52′N – 76°20′E
10.	Sanghol	30°47′N – 75°24′E

DISTT. FARIDKOT

11.	Inewala Theh (Himmat Pura)	30°33′N – 75°25′E
12.	Raja Sirkap	30°39′N – 74°46′E

DISTT. FEROZPUR

13.	Arniwal Theh	30°20′N – 74°15′E

DISTT. BHATINDA

14.	Alipur Mandran	29°50′N – 75°28′E
15.	Baglian de Theh	29°56′N – 75°29′E
16.	Bare	29°55′N – 75°28′E
17.	Chhoti Mansa	29°59′N – 75°26′E
18.	Dhalewan	30°02′N – 75°33′E
19.	Gurni Kalan - 1	29°59′N – 75°33′E
20.	Gurni Kalan - 2	29°59′N – 75°33′E
21.	Hasanpur - 2	29°59′N – 75°33′E
22.	Hirke	29°44′N – 75°22′E
23.	Lakhmir Wala	29°52′N – 75°22′E
24.	Naiwala Theh 1,2,3,4,5	29°50′N – 75°30′E

STATE: RAJASTHAN
PERIOD (PRE-HARAPPAN)

DISTT. HANUMANGARH

1.	Bugian	29°22′N – 73°38′E
2.	Jogiasson	29°10′N – 74°45′E
3.	Kalibangan	29°29′N – 74°08′E
4.	Karoti	29°10′N – 74°52′E
5.	Nohar	29°10′N – 74°45′E
6.	Sherpura	29°10′N – 75°15′E
7.	Sothi	29°11′N – 74°50′E
8.	R.D. 89.	29°12′N – 73°04′E

STATE: JAMMU AND KASHMIR
PERIOD (PRE-HARAPPAN)

DISTT. JAMMU

1.	Manda	32°54′N – 74°48′

STATE: RAJASTHAN
PERIOD(GANESHWAR)

DISTT. SIKAR

1.	Baleshwar	27°44′N – 75°51′E
2.	Balwar	27°35′N – 75°38′E
3.	Baneti	27°48′N – 76°07′E
4.	Banher	27°50′N – 76°07′E
5.	Barnagar	27°33′N – 76°07′E
6.	Basri	27°38′N – 75°45′E
7.	Beed-Ki-Jodhi	27°36′N – 76°09′E
8.	Bhabhra	27°28′N – 76°01′E
9.	Bhadwari	27°34′N – 75°40′E
10.	Bhaikhri	27°34′N – 76°07′E
11.	Bhainsalana	27°39′N – 76°05′E
12.	Bhakhtawar-Ki-Dhani	27°51′N – 76°06′E
13.	Bihar	27°52′N – 75°57′E
14.	Biharipura	27°54′N – 75°54′E
15.	Bhojpura	27°33′N – 75°35′E
16.	Bhukha Bhar	27°37′N – 76°10′E
17.	Buchara	27°33′N – 75°58′E
18.	Burha	27°54′N – 75°58′E
19.	Butholi	27°41′N – 75°46′E
20.	Chardera	27°51′N – 76°06′E
21.	Chaudhri-Ka-Nangal	27°53′N – 76°07′E
22.	Chiplata	27°34′N – 75°34′E
23.	Dariba	27°41′N – 75°54′E
24.	Dilpura	27°50′N – 76°04′E
25.	Ganeshar	27°40′N – 75°49′E
26.	Ghata	27°35′N – 75°51′E
27.	Hothoka (Mothoka)	27°49′N – 75°05′E
28.	Hovra	27°34′N – 75°36′E
29.	Jodhpura	27°55′N – 75°59′E
30.	Khera	27°55′N – 75°59′E
31.	Kolyara	27°44′N – 75°00′E
32.	Malawali Dhani	27°43′N – 75°46′E
33.	Mando	27°44′N – 75°00′E
34.	Nimki	27°35′N – 75°36′E
35.	Panditpur	27°36′N – 76°03′E
36.	Paragpura	27°36′N – 76°03′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

37.	Partheri	27°33′N – 75°45′E
38.	Purani Partheri	27°37′N – 76°09′E
39.	Rajnotha	27°36′N – 76°10′E
40.	Ranasar	27°44′N – 75°43′E
41.	Ram Jhalara	27°35′N – 76°09′E
42.	Sarohi	27°43′N – 75°44′E
43.	Sedoda	27°39′N – 75°49′E
44.	Somanya-Ki-Baoli	27°32′N – 75°56′E
45.	Thikria	27°32N – 76°06 E
46.	Thoi	27°32′N – 76°45′E

STATE: UTTAR PRADESH PERIOD (HARAPPAN)

DISTT. SAHARANPUR

1.	Asan Wali	30°02′N – 77°36′E
2.	Badgam	30°00′N – 77°32′E
3.	Baundki	30°04′N – 77°37′E
4.	Bazidpur	30°03′N – 77°36′E
5.	Chhaj pura	29°59′N – 77°37′E
6.	Chhapar Heri	29°54′N – 77°30′E
7.	Chilhera	30°02′N – 77°39′E
8.	Chunehti Shekh	29°54′N – 77°43′E
9.	Daudpur	30°05′N – 77°36′E
10.	Fahtepur (Gujar)	29°53′N – 77°32′E
11.	Fahtepur Jat	29°56′N – 77°31′E
12.	Ghana Khandi	30°04′N – 77°36′E
13.	Hulas Khera	29°42′N – 77°22′E
14.	Kabirpur	30°05′N – 77°38′E
15.	Kailaspur	29°59′N – 77°39′E
16.	Krishni	29°55′N – 77°30′E
17.	Mohiuddinpur	30°00′N – 77°38′E
18.	Mohiuddinpur	30°00′N – 77°28′E
19.	Matki Jharauli	30°04′N – 77°35′E
20.	Nawan Gaon	29°53′N – 77°26′E
21.	Piki	30°02′N – 77°36′E
22.	Pilakhni	30°01′N – 77°29′E
23.	Pinjaura	29°56′N – 77°33′E
24.	Rangel	29°56′N – 77°40′E
25.	Reri Malakpur	29°55′N – 77°29′E
26.	Salepur	29°56′N – 77°21′E
27.	Sarkari Sheikh	30°00′N – 77°36′E
28.	Sherpur (Gujar)	29°53′N – 77°39′E
29.	Tikrol	29°44′N – 77°22′E

DISTT. MEERUT

30.	Alamgirpur	29°00′N – 77°30′E
31.	Gulistanpur	28°30′N – 77°30′E

STATE: HARYANA PERIOD (HARAPPAN)

DISTT. AMBALA

1.	Dukheri	30°16′N – 76°53′E

DISTT. KURUKSHETRA

2.	Ratta Kher Khuram	30°07′N – 76°27′E

DISTT. KARNAL

3.	Bahola	29°48′N – 76°46′E
4.	Bindrala	29°29′N – 76°35′E
5.	Dikadla	29°13′N – 77°04′E
6.	Jalmana	29°35′N – 76°44′E
7.	Maudi	29°47′N – 76°46′E
8.	Pujam	29°51′N – 76°55′E
9.	Urlana Khurd	29°22′N – 76°43′E

DISTT. JIND

10.	Balu	29°40′N – 76°22′E
11.	Bata (Rani Ran)	29°43′N – 76°19′E
12.	Dhakal	29°35′N – 76°10′E
13.	Ghatouli	29°11′N – 76°23′E
14.	Jind (Bir Band Ban)	29°19′N – 76°19′E
15.	Kalait	29°40′N – 76°16′E
16.	Kharal - 3	29°42′N – 76°03′E
17.	Pauli	29°05′N – 76°28′E
18.	Ritauli	29°25′N – 76°30′E

DISTT. SONIPAT

19.	Chhapra	29°07′N – 76°32′E
20.	Garhwal	29°11′N – 76°32′E

DISTT. ROHTAK

21.	Baliana	28°53′N – 76°43′E
22.	Lohat	28°32′N – 76°50′E

DISTT. BHIWANI

23.	Mitathal	28°52′N – 76°11′E

DISTT. HISSAR

24.	Banawali	29°36′N – 75°25′E
25.	Barki	29°17′N – 75°46′E
26.	Bhirrana	29°32′N – 75°32′E
27.	Chanat - 1, 2, 3	29°14′N – 75°55′E
28.	Chimun	29°40′N – 75°40′E
29.	Garhi	29°04′N – 76°07′E
30.	Gular Wala	29°43′N – 75°46′E
31.	Hansi	29°05′N – 76°59′E
32.	Kharar	29°08′N – 75°54′E
33.	Kirtan	29°08′N – 75°33′E
34.	Kunal	29°38′N – 75°43′E
35.	Masaudpur	29°14′N – 76°00′E
36.	Mirchpur	29°18′N – 76°11′E
37.	Nathwan	29°07′N – 75°35′E
38.	Pali – I	29°08′N – 76°05′E
39.	Rajpura	29°11′N – 76°04′E
40.	Rakhi Garhi	29°17′N – 76°07′E
41.	Ratta Theh	29°44′N – 75°45′E
42.	Satrod Khurd	29°06′N – 75°47′E
43.	Sisai – III	29°10′N – 76°00′E
44.	Siswal	29°13′N – 75°30′E

STATE: PUNJAB PERIOD (HARAPAN)

DISTT. AMRITSAR

1.	Vadalan	31°49′N – 76°48′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

DISTT. KAPURTHALA

2.	Bhatnura Kalan	31°01′N – 75°31′E
3.	Domeli	31°20′N – 75°46′E

DISTT. JULLUNDER

4.	Dhogri	31°23′N – 75°40′E

DISTT. ROPAR

5.	Kotla Nihung	30°56′N – 76°32′E
6.	Kotli	30°53′N – 76°29′E
7.	Ropar	30°58′N – 76°31′E

DISTT. PATIALA

8.	Dharm Heri	30°07′N – 76°19′E
9.	Gheora – 12	30°07′N – 76°16′E
10.	Nagwan	30°07′N – 76°23′E
11.	Sasi	30°07′N – 76°20′E

DISTT. SANGRUR

12.	Budan	30°31′N – 75°46′E
13.	Jandali	30°38′N – 75°51′E
14.	Rohira	30°38′N – 75°50′E
14A	Kalian	30°35′N – 75°43′E
14B	Moholi	30°38′N – 75°45′E

DISTT. LUDHIANA

15.	Kanganwal	30°51′N – 75°56′E
16.	Malaud	30°38′N – 75°57′E
17.	Sanghol	30°47′N – 76°24′E
18.	Talwara	30°55′N – 75°44′E

DISTT. FARIDKOT

19.	Inewala Theh	30°33′N – 75°25′E
20.	Raja Sirkap	30°39′N – 74°46′E

DISTT. FEROZPUR

21.	Amiwala Theh	30°20′N – 75°15′E

DISTT. BHATINDA

22.	Ali-Da-Theh	30°20′N – 75°20′E
23.	Alipur Mandran	29°50′N – 75°28′E
24.	Baglican-Da-Theh	29°56′N – 75°29′E
25.	Chhoti Mansa	29°59′N – 75°26′E
26.	Dale Wala – 1, 2	29°50′N – 75°25′E
27.	Dalewan	30°02′N – 75°33′E
28.	Gurni Kalan	29°59′N – 75°33′E
29.	Hassanpur	29°59′N – 75°33′E
30.	Hirke – I	29°44′N – 75°22′E
31.	Karanpura	29°52′N – 75°23′E
32.	Lakhmir Wala	29°52′N – 75°22′E
33.	Lallian Wali	29°52′N – 75°20′E
34.	Lalu Wala	29°59′N – 75°27′E
35.	Naiwala Theh	29°50′N – 75°30′E

STATE: RAJASTHAN PERIOD (HARAPPAN)

DISTT. HANUMANGARH

1.	Baror	29°10′N – 73°20′E
2.	Bhagwansar 1	29°22′N – 73°53′E
3.	Bhagwansar 2	29°23′N – 73°53′E
4.	Binjor – I	29°14′N – 73°07′E
5.	Binjor 3	29°00′N – 77°12′E
6.	Bugian	29°22′N – 73°38′E
7.	Chak – 11	29°19′N – 73°36′E
8.	Chak – 15/3	29°19′N – 73°36′E
9.	Chak – 21	29°16′N – 73°33′E
10.	Chak – 43	29°10′N – 73°29′E
11.	Chak – 50	29°10′N – 73°29′E
12.	Chak – 71	29°14′N – 73°17′E
13.	Chak – 72/3	29°11′N – 73°19′E
14.	Chak – 75	29°11′N – 73°18′E
15.	Chak – 80	29°12′N – 73°15′E
16.	Jogiason Chak – 1	29°10′N – 74°45′E
17.	Kalibangan	29°29′N – 74°08′E
18.	Karoti	29°10′N – 74°52′E
19.	Mallawala – Tioba	
20.	Mathula	29°14′N – 74°34′E
21.	Motasar Tibba – I	29°09′N – 73°28′E
22.	Motasar Tibba – 2	29°09′N – 73°27′E
23.	Nohar	29°10′N – 74°45′E
24.	R.D. – 92/89	29°10′N – 73°04′E
25.	Sardar Garh – 2	29°23′N – 73°45′E
26.	Sher Pura	29°10′N – 75°15′E
27.	Sothi	29°11′N – 74°50′E
28.	Tarkhana Wala Dera	29°14′N – 73°14′E

STATE: UTTAR PRADESH PERIOD (LATE HARAPPAN)

DISTT. SAHARANPUR

1.	Abha	29°55′N – 77°44′E
2.	Aghiana	29°54′N – 77°17′E
3.	Alipur	29°59′N – 77°27′E
4.	Ambakeri – II	29°44′N – 77°57′E
5.	Aneki – 5	29°59′N – 78°01′E
6.	Anwarpur Baroli	30°08′N – 77°40′E
7.	Asanwali	30°02′N – 77°36′E
8.	Badgam	30°06′N – 77°32′E
9.	Bahadarabad	29°56′N – 78°03′E
10.	Baherkhurd	30°03′N – 77°40′E
11.	Bakaraka Mound	30°00′N – 77°27′E
12.	Bahupur	30°00′N – 77°30′E
13.	Barsi	29°43′N – 77°22′E
14.	Baundki	30°04′N – 77°37′E
15.	Bazidpur	30°03′N – 77°36′E
16.	Bhabri	29°57′N – 77°38′E
17.	Bhedki	29°57′N – 77°36′E
18.	Bholni	30°07′N – 77°41′E
19.	Bilaspur	29°44′N – 77°13′E
20.	Budha Khera Ahir	29°58′N – 77°42′E
21.	Bhudha Khera	30°03′N – 77°31′E
22.	Chaurdeo	29°57′N – 77°44′E
23.	Chhajpura	29°59′N – 77°37′E
24.	Chhapur Heri	29°54′N – 77°30′E
25.	Chilhera	30°02′N – 77°39′E
26.	Chuneti Shekh	29°54′N – 77°43′E
27.	Dhamola	30°00′N – 77°35′E
28.	Daudpur	30°05′N – 77°36′E
29.	Dudli Bukhara	29°56′N – 77°36′E
30.	Faridpur	30°06′N – 77°45′E
31.	Fathepur (Gujar)	29°53′N – 77°32′E
32.	Fathepur Jat	29°56′N – 77°31′E
33.	Hatampur	29°57′N – 78°01′E
34.	Gadhrona	29°46′N – 77°58′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

35.	Garh	29°57′N – 77°58′E
36.	Gathera	30°04′N – 77°30′E
37.	Ghana Khandi	30°04′N – 77°30′E
38.	Harda Kheri	30°02′N – 77°28′E
39.	Hari Bas	29°57′N – 77°40′E
40.	Hulas	29°42′N – 77°22′E
41.	Jainer	30°02′N – 77°43′E
42.	Kabirpur	30°05′N – 77°38′E
43.	Kailaspur	29°59′N – 77°39′E
44.	Kazipur	29°58′N – 77°27′E
45.	Kaul Heri	29°53′N – 77°17′E
46.	Kalal Hatti	29°42′N – 77°13′E
47.	Kaula Kheri	29°41′N – 77°18′E
48.	Khatauli	30°00′N – 77°40′E
49.	Krishni	29°55′N – 77°30′E
50.	Kota	29°54′N – 77°38′E
51.	Kulki - Kalan	29°56′N – 77°39′E
52.	Lakhnauti Kalan	30°03′N – 77°38′E
53.	Landhaur Gujar	29°53′N – 77°31′E
54.	Mahipura	29°58′N – 77°34′E
55.	Mohiuddinpur	30°00′N – 77°38′E
56.	Mohiuddinpur	30°00′N – 77°28′E
57.	Mandowala	30°05′N – 77°45′E
58.	Mandla	30°04′N – 77°39′E
59.	Mathana	30°00′N – 77°44′E
60.	Matki Jharauli	30°04′N – 77°35′E
61.	Mayapur	29°56′N – 78°08′E
62.	Mirpur	29°55′N – 77°16′E
63.	Nalhera Bakal	29°59′N – 77°30′E
64.	Nasirpur	29°45′N – 77°51′E
65.	Nawanbas	29°54′N – 77°17′E
66.	Nawangaon	29°53′N – 77°26′E
67.	Nirpalpur	30°01′N – 77°29′E
68.	Pajrana	30°10′N – 77°40′E
69.	Papreki	29°57′N – 77°37′E
70.	Pathori	29°50′N – 77°37′E
71.	Piki	30°02′N – 77°36′E
72.	Pilakhni	30°01′N – 77°29′E
73.	Pinjaura	29°56′N – 77°33′E
74.	Pujana	29°41′N – 77°21′E
75.	Puranpur	29°58′N – 78°00′E
76.	Rajdhana	30°00′N – 77°28′E
77.	Rangel	29°56′N – 77°40′E
78.	Rasulpur	30°00′N – 77°34′E
79.	Ratan-Kheri	29°57′N – 77°30′E
80.	Reri-Malak-Pur	29°55′N – 77°29′E
81.	Sabdalpur	29°56′N – 77°21′E
82.	Salarpur	29°49′N – 77°16′E
83.	Salepur	29°56′N – 77°21′E
84.	Salepur Bhokri	30°02′N – 77°35′E
85.	Salimpur Mahdud	29°56′N – 77°04′E
86.	Sarkari Kumar	30°02′N – 77°33′E
87.	Sarkari Shekh	30°00′N – 77°36′E
88.	Saruppur Taga	29°56′N – 77°18′E
89.	Sati Kund	29°54′N – 78°09′E
90.	Sherpur Gujar	29°53′N – 77°39′E
91.	Shakarpur	29°48′N – 77°57′E
92.	Shukartal	29°55′N – 77°17′E
93.	Sikri	29°53′N – 77°38′E
94.	Subri Khwaja	29°53′N – 77°37′E
95.	Tahirpur	29°55′N – 77°32′E
96.	Tauli	29°56′N – 77°27′E
97.	Teli Wala	29°57′N – 77°58′E
98.	Thathaula	29°46′N – 77°59′E
99.	Tikrol	29°44′N – 77°22′E

DISTT. MUZAFFARNAGAR

100.	Banti Khera	29°30′N – 77°26′E
101.	Bhura	29°25′N – 77°14′E
102.	Hatchhoya	29°37′N – 77°18′E
103.	Jandheri	29°40′N – 77°26′E
104.	Jasal	29°21′N – 77°17′E
105.	Jhinjhana	29°30′N – 77°15′E
106.	Kailapur	29°20′N – 77°59′E
107.	Kariyana	29°23′N – 77°15′E
108.	Rahatpur	29°39′N – 79°19′E
109.	Sambhalkha	29°25′N – 77°20′E
110.	Sikrera	29°18′N – 77°58′E
111.	Sikri	29°32′N – 77°55′E
112.	Thana Bhawan	29°35′N – 77°25′E
113.	Un	29°35′N – 77°15′E

DISTT. MEERUT

114.	Alamgirpur	29°00′N – 77°30′E
115.	Hastinapur	29°10′N – 78°00′E
116.	Kaseri	28°44′N – 77°22′E
117.	Kashimpur	28°50′N – 76°40′E
118.	Khar Khoda	28°50′N – 76°45′E
119.	Nalhera	29°10′N – 77°21′E
120.	Meerut	29°00′N – 77°45′E
121.	Nahli	29°14′N – 77°33′E

DISTT. BULANDSHAHAR

122.	Bhatpura	28°32′N – 78°03′E
123.	Chandpur	28°37′N – 78°04′E
124.	Deval Khera	28°20′N – 78°15′E
125.	Gulistanpur	28°30′N – 77°30′E
126.	Khanpur	28°25′N – 77°34′E
127.	Lal Qila	28°07′N – 78°10′E
128.	Manpura	28°31′N – 78°01′E

DISTT. ETAH

129.	Attranjikhera	27°42′N – 78°44′E

DISTT. BIJNOR

130.	Rajpura Parsu	29°10′N – 78°10′E

STATE: HARYANA
PERIOD (LATE HARAPPAN)

DISTT. AMBALA

1.	Andheri	30°23′N – 77°07′E
2.	Arnauli	30°14′N – 77°16′E
3.	Badoli	30°21′N – 77°02′E
4.	Bahloli	30°25′N – 76°57′E
5.	Balana	30°20′N – 76°44′E
6.	Bhaderi	30°14′N – 77°18′E
7.	Bhukari	30°11′N – 77°21′E
8.	Chowala	30°15′N – 77°17′E
9.	Dukheri	30°16′N – 76°53′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

10.	Hasanpur	30°21'N – 77°07'E
11.	Kharwan	30°12'N – 77°22'E
12.	Kotar Khana	30°13'N – 77°13'E
13.	Mehran Wala	30°55'N – 76°50'E
14.	Mirpur	30°13'N – 77°19'E
15.	Mulana	30°16'N – 77°02'E
16.	Ratan Heri	30°21'N – 76°56'E
17.	Samel Heri	30°20'N – 76°57'E
18.	Sandhai (Sandh)	30°10'N – 77°15'E
19.	Sudhel	30°10'N – 77°14'E
20.	Suketri	30°45'N – 76°50'E
21.	Tandwal	30°27'N – 77°04'E

DISTT. KURUKSHETRA

22.	Bhani Theh	29°45'N – 76°30'E
23.	Bakana	30°06'N – 76°54'E
24.	Banehra	30°02'N – 76°25'E
25.	Barot—1, 2	29°51'N – 76°31'E
26	Barasana	29°40'N – 76°65'E
27.	Bauli	29°59'N – 76°54'E
28.	Bhagwanpura	30°04'N – 76°57'E
29.	Bhaini	30°02'N – 77°00'E
30.	Bhalari	30°01'N – 77°00'E
31.	Bhawani Khera	29°59'N – 76°50'E
32.	Bibipur	29°59'N – 76°40'E
33.	Bodha	30°04'N – 76°35'E
34.	Budanpura	30°05'N – 76°25'E
35.	Budha Khera	29°50'N – 76°15'E
36.	Chandlana	29°57'N – 76°40'E
37.	Cheeka	30°03'N – 76°21'E
38.	Daulatpur	29°57'N – 76°57'E
39.	Devidaspur	29°58'N – 76°58'E
40.	Dhantor - 1	30°04'N – 76°53'E
41.	Dhurala	30°16'N – 76°55'E
42.	Dudakheri	29°46'N – 76°27'E
43.	Garhi Rodan	29°57'N – 76°43'E
44.	Garhi Sardaran	29°57'N – 76°41'E
45.	Ghamur Kheri	30°00'N – 76°48'E
46.	Gulab Garh	29°57'N – 76°47'E
47.	Hansyala	30°01'N – 76°47'E
48.	Hudia - 2	30°08'N – 77°07'E
49.	Jatheri	29°44'N – 76°33'E
50.	Jogna Khera	29°59'N – 76°48'E
51.	Kala Garh	29°47'N – 76°30'E
52.	Kalwa	30°07'N – 76°58'E
53.	Kandholi	30°05'N – 77°00'E
54.	Kanoli	30°05'N – 76°58'E
55.	Kasaur	30°00'N – 76°15'E
56	Khamba Hera	30°06'N – 76°20'E
57.	Kheri Raiwali	29°52'N – 76°33'E
58.	Kurukshetra - 2	29°58'N – 76°51'E
59.	Lukhi	30°02'N – 76°44'E
60.	Malakpur	30°02'N – 76°38'E
61.	Mehra	30°02'N – 77°04'E
62.	Mirzapur	29°58'N – 76°48'E
63.	Miyoli	29°48'N – 76°33'E
64.	Mohanpur	30°02'N – 76°30'E
65.	Nandu Khera	29°59'N – 76°39'E
66.	Navarsa	30°00'N – 77°01'E
67.	Nainan	29°47'N – 76°32'E
68.	Palwal	29°57'N – 76°52'E
69.	Panditon-Ka-Tila	29°45'N – 76°34'E
70.	Pasawal	29°57'N – 76°15'E
71.	Peedal - 1	30°01'N – 76°20'E
72.	Pundari	29°45'N – 76°33'E
73.	Raja Karan ka Qila	29°58'N – 76°55'E
74.	Pipli	29°58'N – 76°63'E
75.	Ratan Dehra	30°00'N – 76°52'E
76.	Ratta Khera Kuram	30°07'N – 76°27'E
77.	Ratta Khera	30°05'N – 76°16'E
78.	Sangroli	29°50'N – 76°30'E
79.	Sapar Kheri	29°47'N – 76°30'E
80.	Sarola	29°02'N – 76°15'E

DISTT. KARNAL

81.	Augand	29°41'N – 76°47'E
82.	Badher	29°53'N – 76°40'E
83.	Bahola	29°48'N – 76°46'E
84.	Baholi	29°28'N – 76°53'E
85.	Baholpur	29°43'N – 76°50'E
86.	Bala - 1, 2	29°30'N – 76°47'E
87.	Bari Bhani - 1, 2	29°45'N – 76°56'E
88.	Barota	29°38'N – 76°56'E
89.	Baur Sham - 1, 2	29°53'N – 76°47'E
90.	Bijana	29°37'N – 76°56'E
91.	Budanpur	29°42'N – 76°04'E
92.	Buddkern Pin	29°44'N – 76°56'E
93.	Dacher	29°40'N – 76°42'E
94.	Dehra	29°12'N – 77°04'E
95.	Dharam Garh	29°27'N – 76°49'E
96.	Dikadla	29°13'N – 77°04'E
97.	Gagsina	29°34'N – 76°53'E
98.	Gharaunda	29°32'N – 76°58'E
99.	Gitalpur	29°53'N – 76°49'E
100.	Hartari	29°18'N – 76°56'E
101.	Jalmana	29°35'N – 76°44'E
102.	Jaurasi	29°15'N – 76°02'E
103.	Jhanjari	29°45'N – 76°59'E
104.	Joshi	29°25'N – 76°45'E
105.	Kachwah	29°44'N – 76°53'E
106.	Karsa	29°38'N – 76°40'E
107.	Khaja Ahmadpur	29°51'N – 76°55'E
108.	Kheri Man Singh	29°50'N – 77°00'E
109.	Majra Roran	29°47'N – 76°42'E
110.	Manak Majra	29°33'N – 76°54'E
111.	Maudhi	29°46'N – 76°45'E
112.	Naru Kheri	29°38'N – 76°59'E
113.	Naryana	29°46'N – 76°55'E
114.	Nisang - 2	29°42'N – 76°45'E
115.	Patikalyana	29°12'N – 77°01'E
116.	Phaphrana	29°31'N – 76°41'E
117.	Pujam	29°51'N – 76°55'E
118.	Puthar	29°12'N – 76°52'E
119.	Quabulpur	29°23'N – 76°42'E
120.	Raison	29°53'N – 76°48'E
121.	Ramba - 1, 2	29°48'N – 77°00'E
122.	Saga	29°46'N – 76°53'E
123.	Sambhi	29°49'N – 76°49'E
124.	Saunkhra - 1, 2, 3	29°47'N – 76°51'E
125.	Shahpur	29°14'N – 76°49'E
126.	Sham Garh	29°47'N – 76°49'E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

127.	Shakpur Machuri	29°35′N – 76°45′E
128.	Singhra	29°25′N – 76°50′E
129.	Sutana	29°22′N – 76°22′E
130.	Thirana	29°25′N – 76°50′E
131.	Uplana—2, 3, 4	29°35′N – 76°39′E
132.	Urlana Kalan	29°21′N – 76°43′E
133.	Urlana Khurd	29°22′N – 76°43′E

DISTT. JIND

134.	Akal Garh	29°07′N – 76°27′E
135.	Alipur	29°30′N – 76°15′E
136.	Amar Heri	29°20′N – 76°18′E
137.	Amarali Khera	29°22′N – 76°29′E
138.	Anup Garh	29°15′N – 76°21′E
139.	Amar Garh	29°37′N – 76°01′E
140.	Ashraf Garh	29°18′N – 76°22′E
141.	Badsikri Khurd	29°36′N – 76°18′E
142.	Balu	29°40′N – 76°22′E
143.	Barah Khurd	29°17′N – 76°23′E
144.	Baroda - 1, 2	29°26′N – 76°12′E
145.	Baroli	29°23′N – 76°17′E
146.	Baroli	29°16′N – 76°21′E
147.	Barsana	29°22′N – 76°25′E
148.	Bata - 2, 3, 4 (Rani Ran)	29°12′N – 76°19′E
149.	Belarkha	29°39′N – 76°07′E
150.	Beri Khera	29°25′N – 76°23′E
151.	Bhongra	29°26′N – 76°09′E
152.	Budha Khera	29°23′N – 76°30′E
153.	Buwana	29°12′N – 76°18′E
154.	Dalam Wala	29°23′N – 76°23′E
155.	Devera	29°05′N – 76°22′E
156.	Dhakal - 1, 2	29°35′N – 76°10′E
157.	Dharam Garh	29°25′N – 76°40′E
158.	Dharodi	29°38′N – 76°04′E
159.	Dhurmarkha Kalan - 1, 2	29°33′N – 76°09′E
160.	Dhundwa	29°42′N – 76°11′E
161.	Dhingana	29°13′N – 76°26′E
162.	Garhwal	29°10′N – 76°20′E
163.	Ghimana	29°15′N – 76°18′E
164.	Gogrian - 1, 2, 3	29°27′N – 76°15′E
165.	Hathwala	29°06′N – 76°25′E
166.	Hatho	29°38′N – 76°10′E
167.	Jhomola	29°08′N – 76°20′E
168.	Julani Khera	29°21′N – 76°17′E
169.	Jind - 1, 5	29°19′N – 76°19′E
170.	Jiwan Khera	29°24′N – 76°23′E
171.	Kabracha	29°33′N – 76°13′E
172.	Kachrana Kalan	29°29′N – 76°18′E
173.	Ket Ram	29°42′N – 76°21′E
174.	Kalawati	29°20′N – 76°33′E
175.	Kalait	29°40′N – 76°16′E
176.	Kalwan - 2	29°42′N – 75°58′E
177.	Kamalpur	29°36′N – 76°19′E
178.	Kandala—1, 2	29°23′N – 76°20′E
179.	Karam Garh	29°38′N – 76°03′E
180.	Karela - 1	29°08′N – 76°19′E
181.	Karsola	29°09′N – 76°26′E
182.	Kasuna	29°26′N – 76°16′E
183.	Kathana—1, 2, 3	29°33′N – 76°22′E
184.	Kharak Pandvan	29°40′N – 76°17′E
185.	Kharal - 1	29°42′N – 76°03′E
186.	Khapran	29°25′N – 76°10′E
187.	Khatkran - 1	29°24′N – 76°15′E
188.	Khera	29°20′N – 76°30′E
189.	Kheri - Safo	29°31′N – 76°10′E
190.	Kheri Sher Khan	29°33′N – 76°10′E
191.	Kharanti	29°10′N – 76°19′E
192.	Khokhari - 1, 2	29°20′N – 76°20′E
193.	Khema Kheri	29°13′N – 76°23′E
194.	Koel	29°45′N – 76°11′E
195.	Laum	29°40′N – 76°02′E
196.	Ludana	29°14′N – 76°30′E
197.	Malhar Khera	29°22′N – 76°34′E
198.	Mangalpur	29°30′N – 76°04′E
199.	Manoharpur	29°21′N – 76°24′E
200.	Moana	29°26′N – 76°34′E
201.	Mundh	29°31′N – 76°33′E
202.	Niguran - 2	29°26′N – 76°22′E
203.	Nand Garh - 1, 2	29°11′N – 76°28′E
204.	Narana	29°15′N – 76°27′E
205.	Narani	29°15′N – 76°25′E
206.	Pahlwan	29°39′N – 76°12′E
207.	Pinju Pura	29°39′N – 76°12′E
208.	Pipal Theh	29°45′N – 76°05′E
209.	Radhana	29°16′N – 76°22′E
210.	Rai Chand Wala	29°23′N – 76°25′E
211.	Raj Garh	29°08′N – 76°22′E
212.	Ram Garh Pandva - 1, 2	29°39′N – 76°17′E
213.	Ram Kali	29°11′N – 76°24′E
214.	Ritauli	29°25′N – 76°30′E
215.	Samdo	29°29′N – 76°23′E
216.	Sangatpura	29°20′N – 76°14′E
217.	Sangan	29°48′N – 76°13′E
218.	Surbra	29°29′N – 76°04′E
219.	Sedha Majra	29°28′N – 76°08′E
220.	Siamlo Kalan	29°12′N – 76°23′E
221.	Sila Kheri	29°23′N – 76°37′E
222.	Sinad	29°45′N – 76°13′E
223.	Sindhvi Khera	29°17′N – 76°24′E
224.	Singhowal	29°36′N – 76°13′E
225	Solath	29°23′N – 76°31′E
226.	Thuwa	29°32′N – 76°21′E
227.	Todi Khera	29°25′N – 76°42′E
228.	Ujhana - 1, 2	29°42′N – 76°08′E
229.	Urdana	29°28′N – 76°33′E

DISTT. SONIPAT

230.	Ahulana	29°07′N – 76°38′E
231.	Bhawar	29°13′N – 76°30′E
232.	Bhutana	29°11′N – 76°37′E
233.	Bichpari	29°12′N – 76°40′E
234.	Chhapara	29°07′N – 76°32′E
235.	Gangana	29°15′N – 76°37′E
236.	Garhwal	29°11′N – 76°32′E
237.	Midhana	29°00′N – 76°23′E
238.	Nuran Kheri	29°13′N – 76°33′E
239.	Rindana	29°07′N – 76°30′E
240.	Rukhi	29°03′N – 76°41′E

DISTT. ROHTAK

241.	Asan	28°54′N – 76°46′E
242.	Baliana	28°53′N – 76°43′E
243.	Gandhara	28°50′N – 76°44′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

244.	Kansala	28°53′N – 76°46′E
245.	Kasnati	28°53′N – 76°46′E
246.	Madina	28°58′N – 76°28′E
247.	Mana	28°50′N – 76°36′E
248.	Rohtak	28°53′N – 76°35′E
249.	Sanghi	29°02′N – 76°37′E
250.	Sisanah	28°56′N – 76°51′E

DISTT. BHIWANI

251.	Chang	28°53′N – 76°15′E
252.	Mitathal	28°52′N – 76°11′E
253.	Tigrana	28°50′N – 76°09′E

DISTT. MAHENDARGARH

254.	Dadri	28°35′N – 76°16′E
255.	Jhinjar	28°40′N – 76°20′E
256.	Manhairu	28°43′N – 76°14′E
257.	Mishri	28°41′N – 76°16′E

DISTT. GURGAON

258.	Alduka	28°06′N – 76°06′E
259.	Basai Khera	28°28′N – 77°00′E
260.	Basanda	28°23′N – 76°46′E
261.	Gokulpur	27°48′N – 77°07′E
262.	Jasat	28°18′N – 76°38′E
263.	Luhinga Kalan	27°50′N – 77°08′E
264.	Mamlika	27°55′N – 77°08′E
265.	Mandkaula	28°08′N – 77°10′E
266.	Mundetha	27°55′N – 77°08′E
267.	Munkola	28°30′N – 76°54′E
268.	Noor Garh	28°21′N – 76°36′E
269.	Papra	27°54′N – 77°08′E
270.	Sultanpur	27°56′N – 77°08′E
271.	Khandewal (Alwar)	27°43′N – 77°03′E

DISTT. HISSAR

272.	Alipur Kharar - 1, 2	29°08′N – 75°53′E
273.	Banawali	29°36′N – 75°25′E
274.	Bani	29°35′N – 74°35′E
275.	Bhirana	29°32′N – 75°32′E
276.	Burj	29°38′N – 75°40′E
277.	Chimun	29°40′N – 75°40′E
278.	Data	29°15′N – 76°00′E
279.	Garhi	29°04′N – 76°07′E
280.	Ghaswa	29°41′N – 75°41′E
281.	Gular Wala	29°43′N – 75°46′E
282.	Kheri Barki	29°17′N – 75°46′E
283.	Kunal	29°38′N – 75°41′E
284.	Lohar Raghu	29°16′N – 76°04′E
285.	Masood Pur	29°14′N – 76°00′E
286.	Matar Shyam	29°10′N – 75°35′E
287.	Mirch Pur	29°18′N – 76°11′E
288.	Rakhi Garhi (Shahpur Khas)	29°17′N – 76°07′E
289.	Ratta Theh	29°44′N – 75°45′E
290.	Salim Garh	29°10′N – 75°32′E
291.	Satrod Khurd	29°06′N – 75°47′E
292.	Singhwa	29°02′N – 76°17′E
293.	Sisai Bola - 1, 2	29°10′N – 76°01′E
294.	Sisai Kali Ravan - 1, 2 & 4	29°09′N – 76°00′E
295.	Siswal	29°13′N – 75°30′E
296.	Talu	28°59′N – 76°09′E
297.	Theraj	29°44′N – 75°08′E

STATE: PUNJAB
PERIOD (LATE HARAPPAN)

DISTT. GURDASPUR

1.	Achhal Sahib	32°00′N – 75°18′E
2.	Dodwan	32°08′N – 75°25′E
3.	Gurdas-Nangal-Da-Theh	32°00′N – 75°22′E
4.	Hardo-Raval-Khurd	31°55′N – 74°57′E
5.	Haripur	31°55′N – 74°55′E
6.	Jagria	32°05′N – 75°29′E
7.	Kanwa	32°10′N – 75°30′E
8.	Lohgarh	32°14′N – 75°30′E
9.	Vadalan Garanthian	31°50′N – 75°17′E

DISTT. AMRITSAR

10.	Chhina	31°45′N – 74°45′E
11.	Gharinda	31°35′N – 74°35′E
12.	Her	31°40′N – 74°48′E

DISTT. HOSHIARPUR

13.	Galarian	31°57′N – 75°39′E
14.	Mahatpur	31°55′N – 75°39′E

DISTT. KAPURTHALA

15.	Karalan	31°12′N – 75°12′E
16.	Domeli	31°20′N – 75°46′E

DISTT. JALANDHAR

17.	Apara	31°05′N – 75°52′E
18.	Chini-Kangri-Da-Theh	31°23′N – 75°47′E
19.	Dhonderi	31°22′N – 75°40′E
20.	Dhogri	31°23′N – 75°40′E
21.	Haripur	31°22′N – 75°44′E
22.	Kartarpur	31°25′N – 75°30′E
23.	Katpalon	31°02′N – 75°51′E
24.	Malsian	31°07′N – 75°22′E
25.	Nagar	31°02′N – 75°50′E
26.	Nauli	31°23′N – 75°40′E
27.	Rahon	31°02′N – 76°05′E
28.	Saprod Nangal	31°15′N – 75°43′E

DISTT. ROPAR

29.	Bara	30°55′N – 76°30′E
30.	Basi Gujran	30°53′N – 76°21′E
31.	Chamkaur	30°54′N – 76°25′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

32.	Chitauli	30°51′N – 76°35′E
33.	Dugri	30°54′N – 76°28′E
34.	Hawara	30°50′N – 76°24′E
35.	Kainur	30°50′N – 76°30′E
36.	Kotli	30°53′N – 76°29′E
37.	Kuba Heri	30°52′N – 76°40′E
38.	Kurara/Kurari	30°39′N – 76°46′E
39.	Manela	30°50′N – 76°21′E
40.	Pallanpur	30°52′N – 76°41′E
41.	Rampur	30°36′N – 76°47′E
42.	Siswan	30°50′N – 76°42′E

DISTT. PATIALA

43.	Banhera	30°20′N – 76°13′E
44.	Bhasmara (Burj)	30°09′N – 76°29′E
45.	Bhura	30°28′N – 76°10′E
46.	Brass	30°35′N – 76°32′E
47.	Chanarthal Kalan	30°31′N – 76°21′E
48.	Dadhera	30°20′N – 76°21′E
49.	Dandrala	30°28′N – 76°18′E
50.	Dhablan	30°20′N – 76°15′E
51.	Dhammo Majra	30°20′N – 76°22′E
52.	Dhangerian	30°37′N – 76°30′E
53.	Dharam Heri	30°07′N – 76°19′E
54.	Dhingi	30°25′N – 76°07′E
55.	Durd	30°10′N – 76°27′E
56.	Gajju Khera	30°35′N – 76°28′E
57.	Galwadhi	30°42′N – 76°14′E
58.	Ghurami	30°08′N – 76°29′E
59.	Gheora	30°07′N – 76°16′E
60.	Hansali	30°36′N – 76°29′E
61.	Iserhel	30°38′N – 76°31′E
62.	Kalwa	30°25′N – 76°26′E
63.	Khera	30°36′N – 76°29′E
64.	Kheri Gaurian	30°23′N – 76°15′E
65.	Kumhara	30°38′N – 76°18′E
66.	Lachkane	30°25′N – 76°21′E
67.	Lalauda	30°22′N – 76°17′E
68.	Lataur	30°32′N – 76°25′E
69.	Lopen	30°28′N – 76°11′E
70.	Majri Jattan	30°38′N – 76°13′E
71.	Naugawan	30°07′N – 76°23′E
72.	Naura	30°26′N – 76°06′E
73.	Pinaundian	30°26′N – 76°26′E
74.	Rajgarh	30°25′N – 76°45′E
75.	Rohta	30°22′N – 76°12′E
76.	Seel	30°20′N – 76°32′E
77.	Suniarheri	30°27′N – 76°26′E
78.	Uchcha Gaon	30°22′N – 76°21′E
79.	Uchcha Khera	30°34′N – 76°38′E

DISTT. SANGRUR

80	Bahawa	30°29′N – 75°48′E
81	Bhassaur	30°26′N – 75°55′E
82	Bhudan	30°31′N – 75°46′E
83	Jandali	30°38′N – 75°51′E
84	Mahorana	30°29′N – 75°57′E
85.	Mohammadpur	30°32′N – 75°55′E
86.	Rohira	30°38′N – 75°50′E
86A.	Kalian	30°35′N – 75°43′E
86B.	Moholi	30°38′N – 75°45′E

DISTT. LUDHIANA

87.	Badla	30°45′N – 76°28′E
88.	Baddowal	30°52′N – 75°46′E
89.	Badla Nicha	30°46′N – 76°17′E
90.	Bahrampur	30°43′N – 76°25′E
91.	Banali	
92.	Barwali	30°47′N – 76°17′E
93.	Basi (Gujran)	30°53′N – 76°21′E
9t.	Bathan/Mathan	30°47′N – 76°23′E
95.	Burkhara	30°35′N – 75°55′E
96.	Chandiala	30°52′N – 76°20′E
97.	Dadheri	30°40′N – 76°19′E
98.	Daheru	30°45′N – 76°09′E
99.	Dandra	30°51′N – 75°48′E
100.	Doraha	30°48′N – 76°01′E
101.	Jhogrodi	30°50′N – 76°10′E
102.	Kaddon	30°46′N – 76°02′E
103.	Kanganwal	30°51′N – 76°56′E
104.	Katana	30°50′N – 76°04′E
105.	Kheri Nudh Singh	30°44′N – 76°22′E
106.	Kiri	30°56′N – 75°41′E
107.	Kohada	30°52′N – 76°00′E
108.	Kot Mandial	30°47′N – 76°03′E
109.	Lohar Majra	30°42′N – 76°19′E
110.	Malaud	30°38′N – 75°57′E
111.	Manupura	30°76′N – 46°15′E
112.	Newan (Fetehpur)	30°44′N – 76°21′E
113.	Sanghol	30°47′N – 76°24′E
114.	Sohavi	30°45′N – 76°24′E
115.	Talwara	30°55′N – 75°44′E

DISTT. FARIDKOT

116.	Dogru	30°50′N – 75°03′E
117.	Inewala Theh (Himmat Pura)	30°33′N – 75°25′E
118.	Sosan	30°50′N – 75°00′E

DISTT. BHATINDA

119.	Ali-Da Theh	30°20′N – 75°20′E
120	Alipur Mandra	29°50′N – 75°28′E
121.	Bare—2	29°55′N – 75°28′E
122.	Bhikhi	30°04′N – 75°31′E
123.	Chhoti Mansa	29°59′N – 75°26′E
124.	Danewala - 1	29°50′N – 75°24′E
125.	Danewala - 2	29°50′N – 75°24′E
126.	Dalewala - 1	29°50′N – 75°25′E
127.	Nehriwala Theh	30°05′N – 75°33′E
128.	Sahnewali	29°55′N – 75°06′E

CHANDIGARH

1.	Chandigarh	30°45′N – 76°47′E
2.	Nada	30°47′N – 76°48′E
3.	Parachh	30°48′N – 76°46′E
4.	Sarangpur	30°46′N – 76°48′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

STATE: HIMACHAL PRADESH
PERIOD (LATE HARAPPAN)
DISTT. SOLAN

1.	Bikkum	31°05′N – 76°38′E
2.	Dhang	31°05′N – 76°40′E
3.	Dher Majra	31°02′N – 76°37′E

STATE: DELHI
PERIOD (LATE HARAPPAN)

1.	Dhansa	28°31′N – 76°56′E

STATE: GUJARAT
PERIOD (LATE HARAPPAN)
DISTT. KUTCH

1.	Jhangar	23°18′N – 70°05′E
2.	Katasar	23°34′N – 70°29′E
3.	Kotada Bhadli	23°22′N – 69°26′E
4.	Kotada	23°17′N – 70°06′E
5.	Luna	23°40′N – 69°15′E
6.	Luna Mandvi	22°50′N – 69°24′E
7.	Navinal	22°50′N – 69°35′E
8.	Pabunath	23°38′N – 70°31′E
9.	Samagogha	22°55′N – 69°40′E
10.	Surkotada	23°37′N – 70°50′E

DISTT. JAMNAGAR

11.	Ali-Bada	22°27′N – 70°13′E
12.	Amra	22°24′N – 69°56′E
13.	Bed	22°26′N – 69°55′E
14.	Bhangor	22°05′N – 69°52′E
15.	Binangari	22°44′N – 70°22′E
16.	Gop	22°01′N – 69°56′E
17.	Hariana	22°36′N – 70°15′E
18.	Jaidak	22°40′N – 70°35′E
19.	Kalianpur	21°50′N – 69°50′E
20.	Kotada	22°12′N – 70°22′E
21.	Lakhabawal	22°24′N – 70°00′E
22.	Mora	22°26′N – 70°14′E
23.	Morpur	22°16′N – 69°48′E
24.	Narmana	22°05′N – 70°09′E
25.	Phala	22°31′N – 70°18′E
26.	Pitar	22°41′N – 70°32′E
27.	Ranparda	21°55′N – 69°30′E
28.	Senalo	22°12′N – 70°25′E
29.	Tankaria	21°55′N – 69°28′E
30.	Venkiner	21°50′N – 69°25′E
31.	Virpur	22°07′N – 70°06′E
32.	Wasai	22°26′N – 69°56′E
33.	Dhulkot	20°50′N – 71°02′E
34.	Khambhodhar	21°45′N – 69°35′E
35.	Kindar Khera	21°48′N – 69°33′E
36.	Prabhas Patan	20°54′N – 70°24′E
37.	Shrinagar	21°39′N – 69°37′E

DISTT. RAJKOT

38.	Adkot	22°00′N – 71°10′E
39.	Adkot Bus Stand	22°00′N – 71°10′E
40.	Ajmer	22°40′N – 70°50′E
41.	Ardoi	22°05′N – 70°47′E
42.	Belora	21°48′N – 70°26′E
43.	Bhalgam	22°02′N – 71°05′E
44.	Daidungri	22°00′N – 71°05′E
45.	Devdhar	22°07′N – 71°09′E
46.	Ghorwada	21°47′N – 70°53′E
47.	Ghodhapadar	20°05′N – 71°03′E
48.	Kalapan	21°55′N – 70°20′E
49.	Kerali	22°50′N – 70°30′E
50.	Koba	21°45′N – 70°50′E
51.	Kundanpur	22°05′N – 72°10′E
52.	Malgam	22°01′N – 71°26′E
53.	Pitaria	21°48′N – 70°39′E
54.	Rojdi	21°50′N – 70°45′E
55.	Thebachada	22°16′N – 70°50′E

DISTT. AMRELI

56.	Bhamakdal	21°45′N – 70°50′E
57.	Bhatiwadi	21°45′N – 70°50′E
58.	Bodiyo	21°49′N – 71°06′E
59.	Devalio	21°52′N – 71°25′E
60.	Dhankanio	21°46′N – 70°55′E
61.	Dhrosan	20°50′N – 70°30′E
62.	Kaj	20°44′N – 70°45′E
63.	Kanjetar	20°45′N – 70°40′E
64.	Lakhovav	21°51′N – 71°27′E
65.	Machiala Mota	21°41′N – 71°14′E
66.	Madeva	21°50′N – 71°24′E
67.	Madhi	21°45′N – 70°50′E
68.	Mahadevio	21°54′N – 71°17′E
69.	Neshdo	21°53′N – 71°23′E
70.	Randalio	21°48′N – 71°03′E
71.	Sultanpur	21°45′N – 70°50′E
72.	Tetariyo	21°49′N – 71°06′E
73.	Vanivadar	21°39′N – 71°09′E

DISTT. BHAVNAGAR

74.	Adatala	21°58′N – 71°37′E
75.	Bhojavadar	21°52′N – 71°42′E
76.	Bhoklidhar	21°58′N – 71°38′E
77.	Budhel	21°41′N – 72°09′E
78.	Charanio	21°52′N – 71°38′E
79.	Chosla	21°53′N – 71°34′E
80.	Chota Isvaria	21°57′N – 71°34′E
81.	Hanuman—No—Timbo	21°57′N – 71°34′E
82.	Halivalo	21°57′N – 71°40′E
83.	Itaria	21°58′N – 71°27′E
84.	Isvaria	21°58′N – 71°42′E
85.	Jivani-No-Dhoro	21°52′N – 71°45′E
86.	Kerlavlo	21°51′N – 71°38′E
87.	Khanderio (Rampara) -1	21°58′N – 71°38′E
88.	Khanderio (Rampara) -2	21°58′N – 71°29′E
89.	Khetarvalo	21°58′N – 71°37′E
90.	Khodiyar	21°24′N – 71°09′E
91.	Lankhamka	21°48′N – 71°38′E
92.	Makvana	21°57′N – 71°40′E
93.	Oriyo	21°54′N – 71°32′E
94.	Pasegam	21°41′N – 71°34′E
95.	Phul Timbo	21°52′N – 71°44′E
96.	Phul Wadi	21°51′N – 71°40′E
97.	Rajpipla - 1	21°51′N – 71°33′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

98.	Rajpipla - 2	21°51′N – 71°33′E
99.	Rajpipla - 3	21°51′N – 71°33′E
100.	Rajpipla - 4	21°51′N – 71°34′E
101.	Rajpipla - 5	21°51′N – 71°34′E
102.	Rajpipla - 6	21°51′N – 71°34′E
103.	Rajpipla - 7	21°51′N – 71°34′E
104.	Rajpipla - 8	21°51′N – 71°34′E
105.	Rajpipla - 9	21°51′N – 71°34′E
106.	Rampara - 1	21°58′N – 71°29′E
107.	Rampara - 2	21°58′N – 71°29′E
108.	Ranigam	21°59′N – 71°45′E
109.	Samadhiala	21°52′N – 71°40′E
110.	Seed Farm	21°57′N – 71°36′E
111.	Tatana	21°58′N – 71°39′E
112.	Vaharvo	21°51′N – 71°44′E

DISTT. SURENDRA NAGAR

113.	Babarkot	22°16′N – 71°35′E
114.	Chachana	22°25′N – 71°50′E
115.	Devalio	22°22′N – 71°50′E
116.	Pansina	22°32′N – 71°58′E
117.	Rangpur	22°20′N – 71°55′E
118.	Vadgam	22°21′N – 71°27′E

DISTT. AHMEDABAD

119.	Akru	22°15′N – 71°55′E
120.	Alau	22°15′N – 71°40′E
121.	Bhimpatal	22°15′N – 71°40′E
122.	Kotch	22°38′N – 72°18′E
123.	Lothal	22°31′N – 72°15′E
124.	Pavteswar	21°10′N – 71°54′E

DISTT. BAROACH

125.	Bhagatrav	21°29′N – 72°52′E
126.	Chavaneshwar	21°41′N – 72°48′E
127.	Hasanpur	21°33′N – 72°46′E
128.	Megham	21°42′N – 72°45′E
129.	Telod	21°42′N – 72°46′E

DISTT. SURAT

130.	Malvan	21°06′N—72°43′E

STATE: GUJRAT PERIOD (HARAPPAN)

DISTT. KUTCH

1.	Chitrol	23°24′N – 70°40′E
2.	Desalpur	23°29′N – 69°10′E
3.	Dholvira (Kotadi)	23°58′N – 70°12′E
4.	Gadhwaliwadi	23°30′N – 69°08′E
5.	Gunthai	23°28′N – 69°09′E
6.	Jatavadar	23°45′N – 70°40′E
7.	Kanthkot	23°29′N – 70°29′E
8.	Kerasi	23°40′N – 70°44′E
9.	Khakhra Dera	23°34′N – 70°29′E
10.	Khari-Ka-Khanda	23°27′N – 70°19′E
11.	Khedoi	23°03′N – 69°57′E
12.	Kotada Bhadli - 1	23°22′N – 69°26′E
13.	Kotada Bhadli - 2	23°22′N – 69°26′E
14.	Kotada	23°17′N – 70°06′E
15.	Kotadi	23°58′N – 70°12′E
16.	Kotara-Juni-Kuran	24°00′N – 69°45′E
17.	Lakhapar	23°33′N – 70°28′E
18.	Lakhpat	23°50′N – 68°47′E
19.	Morvo	23°50′N – 70°42′E
20.	Narapa	23°34′N – 69°05′E
21.	Nenu-Ni-Dhar	23°51′N – 69°44′E
22.	Pirwada	23°20′N – 70°00′E
23.	Pabunath	23°38′N – 70°31′E
24.	Rampara (Vekera No Timbo)	23°30′N – 70°45′E
25.	Ramvav	23°32′N – 70°28′E
26.	Samaghoga	22°55′N – 69°40′E
27.	Selari	22°42′N – 70°37′E
28.	Surkotada	23°37′N – 70°50′E
29.	Todio	23°05′N – 69°55′E
30.	Vada	23°34′N – 69°03′E

DISTT. BANASKANTHA

31.	Atarnes	23°40′N – 71°20′E
32.	Benap	24°05′N – 71°25′E
33.	Jhekada	23°50′N – 71°25′E

DISTT. MEHSANA

34.	Dudkha	23°32′N – 71°46′E
35.	Kuwar	23°32′N – 71°37′E
36.	Lalara	23°33′N – 71°47′E
37.	Mahudi	23°30′N – 72°45′E
38.	Pirozpur	23°30′N – 71°43′E
38A.	Bolera	23°30′N – 71°45°E
38B.	Khandia	23°32′N – 71°45′E
38C.	Manverpur	23°35′N – 71°54′E
38D.	Dhanora	23°31′N – 71°55′E
38E.	Dantisana	23°30′N – 71°54′E
38F.	Sushiya	23°28′N – 71°53′E
38G.	Ervada	23°25′N – 71°53′E
38H.	Panchasar	23°25′N – 71°49′E
38I.	Panva	23°23′N – 71°49′E
39.	Sibpur	23°33′N – 71°46′E
40.	Sujnipur	23°53′N – 72°05′E

DISTT. JAMNAGAR

41.	Ambaliala	22°56′N – 69°44′E
42.	Bedwarka	22°28′N – 70°26′E
43.	Bhayakhakharia	22°10′N – 71°50′E
44.	Chanderwara	21°51′N – 69°24′E
45.	Kotda	23°14′N – 70°21′E
46.	Lakhan Timbo	22°29′N – 70°26′E
47.	Mulpadar	21°56′N – 69°44′E
48.	Saudevalio	22°00′N – 69°44′E
49.	Tarana	22°43′N – 70°27′E

DISTT. JUNAGARH

50.	Savani	20°58′N – 70°28′E

DISTT. RAJKOT

51.	Bhut Kotada	22°35′N – 70°45′E
52.	Dad	22°50′N – 70°55′E
53.	Dhutapur	21°50′N – 71°00′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

54.	Dumaini	21°45′N – 70°20′E
55.	Dungarpur	22°71′N – 71°31′E
56.	Gadhada - 1	22°26′N – 70°36′E
57.	Gadhada - 2	22°26′N – 70°36′E
58.	Gadhada - 3	22°26′N – 70°36′E
59.	Jhikri	21°55′N – 70°50′E
60.	Jodhpur	22°40′N – 70°53′E
61.	Karmar	21°50′N – 70°53′E
62.	Khankhara Bela - 1	22°29′N – 70°36′E
63.	Khankhar Bela - 2	22°29′N – 70°36′E
64.	Khareda-No-Timbo	22°05′N – 70°48′E
65.	Lukhela	21°50′N – 70°00′E
66.	Malgodh	22°00′N – 70°34′E
67.	Padar	21°59′N – 70°50′E
68.	Pal	22°18′N – 70°43′E
69.	Pithad	21°57′N – 70°44′E
70.	Pithadia	21°48′N – 70°49′E
71.	Rajathali	21°55′N – 71°01′E
72.	Taraghada	21°50′N – 71°28′E
73.	Timaram	21°53′N – 70°30′E
74.	Vadasada	21°47′N – 70°45′E
75.	Vegadi	21°47′N – 70°30′E

DISTT. AMRELI

76.	Bhatiwadi	21°45′N – 70°50′E
77.	Dhankanio - 2	21°47′N – 70°55′E
78.	Dhuapino	21°27′N – 71°49′E
79.	Vadera	21°36′N – 71°06′E

DISTT. BHAVNAGAR

80.	Gheolo Bund	21°58′N – 71°27′E
81.	Khodiyar	21°24′N – 71°09′E
82.	Lakhavav	21°30′N – 71°55′E
83.	Valpura	21°57′N – 71°42′E

DISTT. SURENDRA NAGAR

84.	Chashiana	22°25′N – 71°50′E
85.	Goni Timbo	22°27′N – 71°55′E
86.	Kaero Timbo	22°24′N – 71°55′E
87.	Khanpur	22°32′N – 71°58′E
88.	Rangpur	22°20′N – 71°55′E
89.	Samadhiala	22°19′N – 71°42′E

DISTT. AHMEDABAD

90.	Bhimnath	22°15′N – 71°55′E
91.	Chhabasr	22°46′N – 72°16′E
92.	Devganga	22°18′N – 71°50′E
93.	Hadmatala	22°30′N – 72°08′E
94.	Kanasutaria	22°47′N – 72°16′E
95.	Lothal	22°31′N – 72°15′E
96.	Metal Maha No Timbo	22°47′N – 72°14′E
97.	Talwandi No Timbo	22°45′N – 72°20′E

DISTT. KHERA

98.	Kerisima No Timbo	22°28′N – 72°31′E
99.	Sai No Tikro	22°28′N – 72°31′E

DISTT. BHARUCH

100.	Manar	21°42′N – 72°47′E

DISTT. SURAT

101.	Navagam	21°16′N – 72°56′E

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

53

K.N. Dikshit

The Sothi Complex: Old Records and Fresh Observations

Sothi, District Sri Ganganagar, Rajasthan (Lat 29° 10′, Long 74° 50′), is located in the plains of the Saraswati, about 10 km south-west of Nohar, a Railway station. The mound is merging with the surrounding sandy land, except for some bulge in the centre. The pottery was found strewn in an area of about 200 × 200 m.[1]

Aurel Stein was the first to survey the lost Saraswati in 1940–41 (Stein 1942) for archaeological sites. He clearly found three old channels of the Satluj, presently known as Naiwala, and one channel of the Drishadvati, the modern Chautang, which once joined the Saraswati. A concentration of sites was noticed in its basin in areas around Fort Abbas, Marut Fort, Kudwala and Derawar, in the old Bahawalpur State, now in Pakistan. A trial excavation at Sandhanwala Ther, five km to the north-west of Fort Abbas, revealed in the lower levels the remains of what Ghosh (1965) called 'Sothi Ware'. Its total deposit was only about 2 metres. A sterile layer separated this deposit from the upper occupation of mature Harappan Culture. In 1951 Ghosh also explored the lost Saraswati from Hanumangarh to Anupgarh and noticed about 25 Harappan mounds, including Kalibangan, Sothi and Nohar. He had even excavated Tarkhanwala Dera and Sothi (Ghosh 1952). Some of these sites were revisited at different times by K.F. Dalal (1980:33–43), and the present author (Dikshit 1979:105–106; 1980: 32–43). Sothi, Nohar and a newly explored site of Sherpura have, however, been closely examined by this author. In fact, some trial trenches were laid at Nohar and Sothi. Dalal had also laid a trial trench at Binjor-3 and noticed Sothi Ware from the depth of 0.35 m to 1.10 m, overlying the hard and dark brown natural soil. Numerous bones, charcoal pieces and red burnt plaster fragments were recovered along with pottery. Once again, Harappan potsherds were found only in the upper levels. It may be observed that most of these settlements are very small, not more than 200 × 100 metres in area, and practically merging with the surrounding plain. The occupational deposit of the Sothi Culture at Sandhanwala Ther is about 2 m, at Binjor 1.75 m, at Kalibangan 1.60 m, at Siswal 1.20 m and at Balu 1 m. Recently, at Banawali this deposit has been reported as 3.00 m. These data suggest that as we move from the west to the east, the occupational thickness increases. In other words, the Sothi Culture-complex persisted much longer in the east than in the west.

THE SOTHI COMPLEX

The sites of Sothi Ware, at the present state of our knowledge, are confined to Cholistan (around Bahawalpur region, Pakistan), northern Rajasthan, Haryana and southern Punjab **(fig. 53.1)**. It has not been reported from the Indus basin. In the Punjab no settlement exclusively of the Sothi complex has so far been noticed; the known sites have yielded both the Sothi (in the lower levels) and the Harappan pottery (in the upper levels). It is, therefore, clear that in northern Rajasthan and in parts of Haryana (Banawali and Balu), the Sothi people were living much before the arrival of the Harappans who did not establish their townships on

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

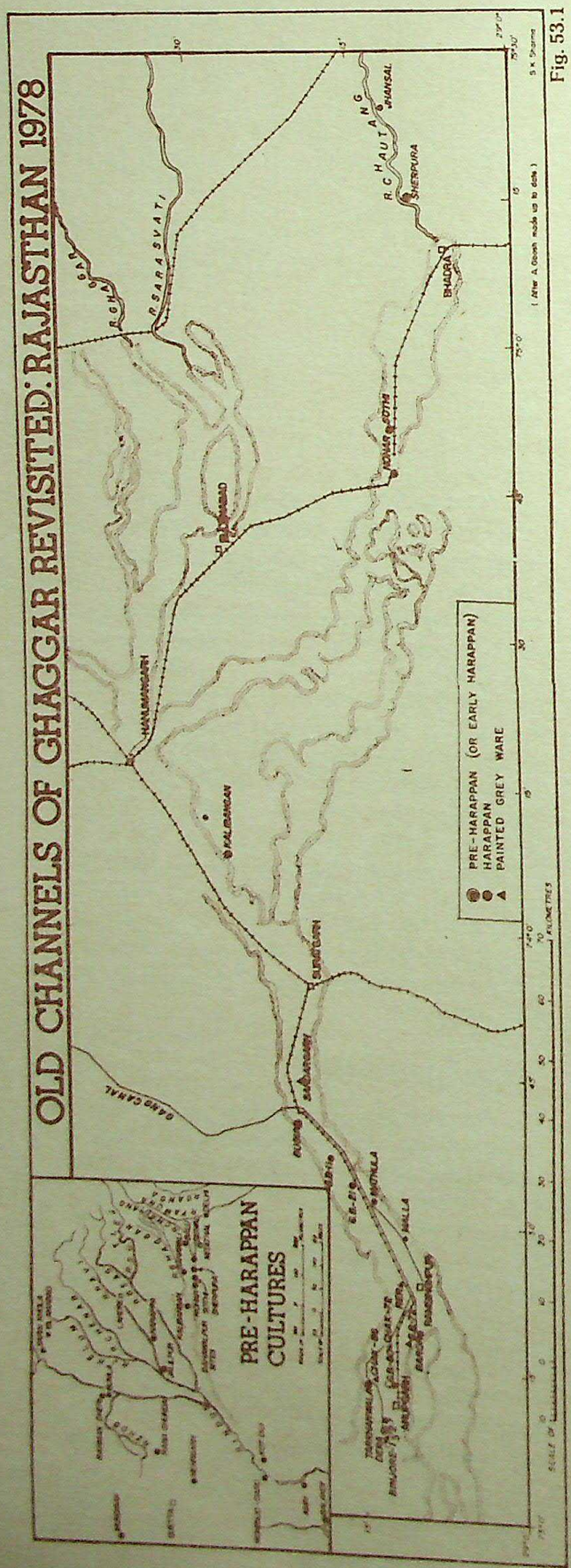


Fig. 53.1

virgin soil but occupied sites of the Sothians, some of which were the living sites and some deserted. But in southern Punjab they occupied practically every Sothi site. It might mean, significantly enough, that in case we take the Harappan Culture only as the mature phase of the Sothi Culture, as the usage of the term Early Harappan for it by Mughal would imply, then it will mean that the change from the Sothi to Harappan Culture took place in southern Punjab and not in the Indus basin, not even in Cholistan, as Mughal (1975) and Gupta (1978) seem to think.

EXCAVATIONS BY GHOSH

Ghosh laid six trenches at Sothi, STH-A to STH-F. Trenches A and B, each about 7.29 m in length, were laid in north-south direction **(fig. 53.2).** The trench STH-A, which was on the top of the mound, had an occupational deposit of about 60 cm whereas STH-B, which is on the slope, yielded occupational deposit of only 30 cm. The location of other trenches is not clear from the reports left behind, but from the occupational thickness recorded, it appears that these were placed on the top of the mound. Trench STH-D yielded the maximum thickness of occupation. Trench STH-D revealed occupational deposit of about 2.50 m neatly divided into ten layers **(fig. 53.2).** Layers 1, 2, 4 to 7, 9 and 10 were of loose earth, whereas layers 3 and 8 were of hard earth. The concentration of potsherds was noticed upto layer 6, which is at the depth of 1.35 m from the surface. However, only three potsherds along with one bone piece were found to have percolated in layers 8, 9 and 10, with an average of one potsherd each layer. Moreover, these three layers are completely devoid of any other habitational sign, except some charcoal specks which may also have percolated. The underlying natural soil, which is lying on a kankary bed, varies in colour from dark brown to light brown and is clayey in formation.

FRESHDATA

In 1978, a trial trench of 2 × 2 m was laid by the present writer on the western side of the mound (Dikshit 1980:32–43). The trench was dug upto the depth of 3.40 m **(fig. 53.2).** A deposit of loose earth from surface to 0.50 m consisted of mixed pottery—Harappan and Sothi, whereas from 0.50 m to 0.70 m it was only Sothi. The loose earth was found mixed up with clay patches. From 0.70 m to

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

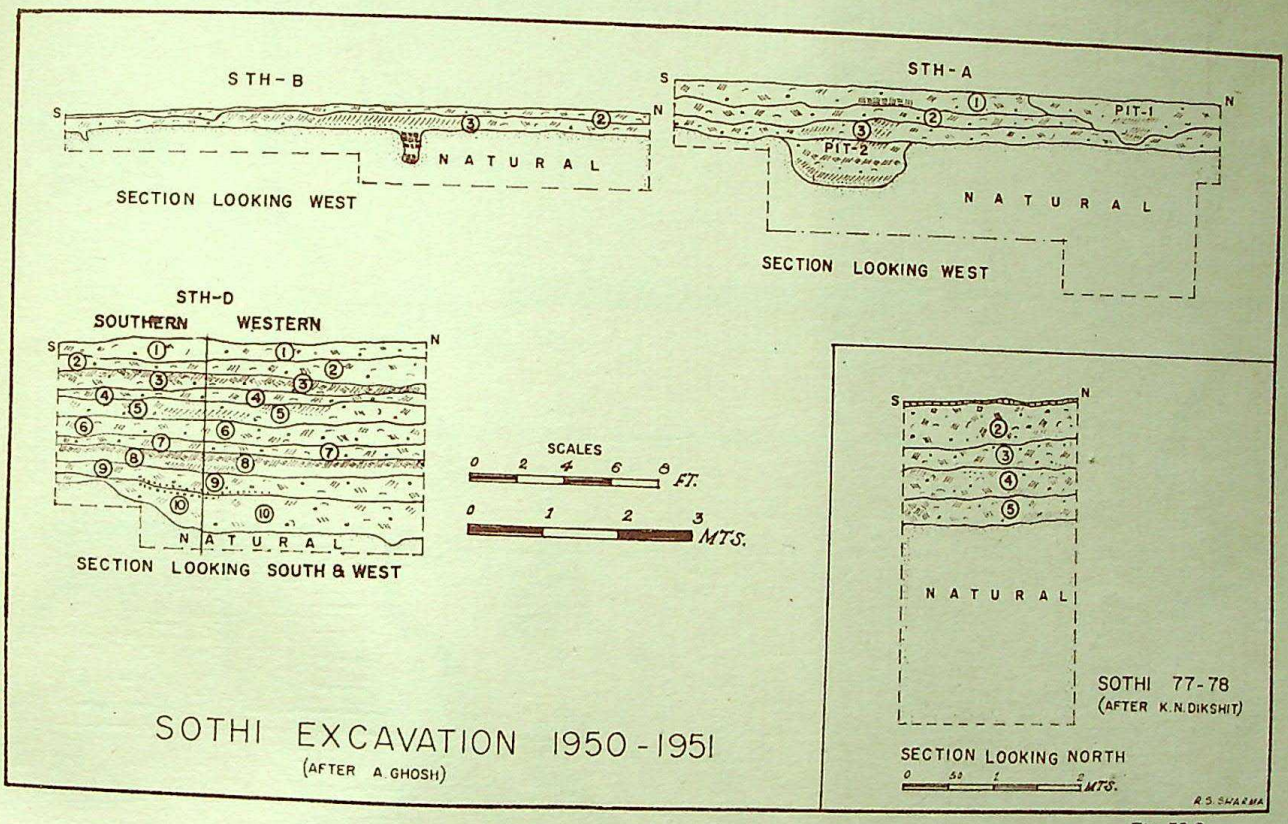


Fig. 53.2

1.30 m the potsherds were scarce but beyond 1.30 m, upto 3.40 m the loose earth was without any pottery. However, in this trench no hard earth was encountered. Due to the loose nature of the earth, the sections were maintained with great difficulty.

Pottery and other antiquities

The pottery complex was dominated by Fabric C and D of Kalibangan. Jars, bowls and basins were numerically the largest. Painted potsherds and bichrome ware (Fabric A) are there but very few. This pottery is of pale red colour with black paintings laid on a whitish band which served as the secondary base **(fig. 53.3)**. However, other antiquities were confined to upper 0.50 m deposit and therefore they belong to 'mature' Harappan phase. These objects include terracotta cakes, triangular and round balls pierced in the middle with four divisions, cart-frames and bangles. A few fragmentary burnt bricks were also noticed.

DISCUSSION

It was in the excavations at Kalibangan that the stratigraphical position of the Sothi Ware was first determined. There the Sothi complex consisted of painted motifs on Fabric A potsherds with bichrome technique, incised pottery (Fabric D), grey ware (Fabric F) and mud-brick structures of brick sizes (9 × 19 × 28 cm) in the ratio of 1: 2: 3 (Ghosh 1965; Gupta 1978). Ghosh (1965) compared Sothi Ware with the pre-Defence pottery of Harappa and of the pre-Harappan pottery of Kot Diji. According to him some of the designs of Sothi pottery can also be compared with those of Kile Gul Mohammad black-on-red Ware, Kechi Beg black-on-buff Ware, Quetta Ware, Jangal Coarse and Painted Ware. The correlation of Fabric B with so-called 'Wet Wares', including Khojak Parallel Striated Ware of the Quetta region, and Fabric D with shape and design of a basin found in period IB at Amri, according to Mughal (1975: 101), do not seem to be valid, the cultural gamut of Cholistan and northern Rajasthan do not show dominant influence of Baluchistan and the Iranian border culture-complexes, although Mughal (1980) has published a plate of buff painted ware from Cholistan. The influence was, therefore, there though only marginal.

Sothi and Nohar have occupational continuity,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

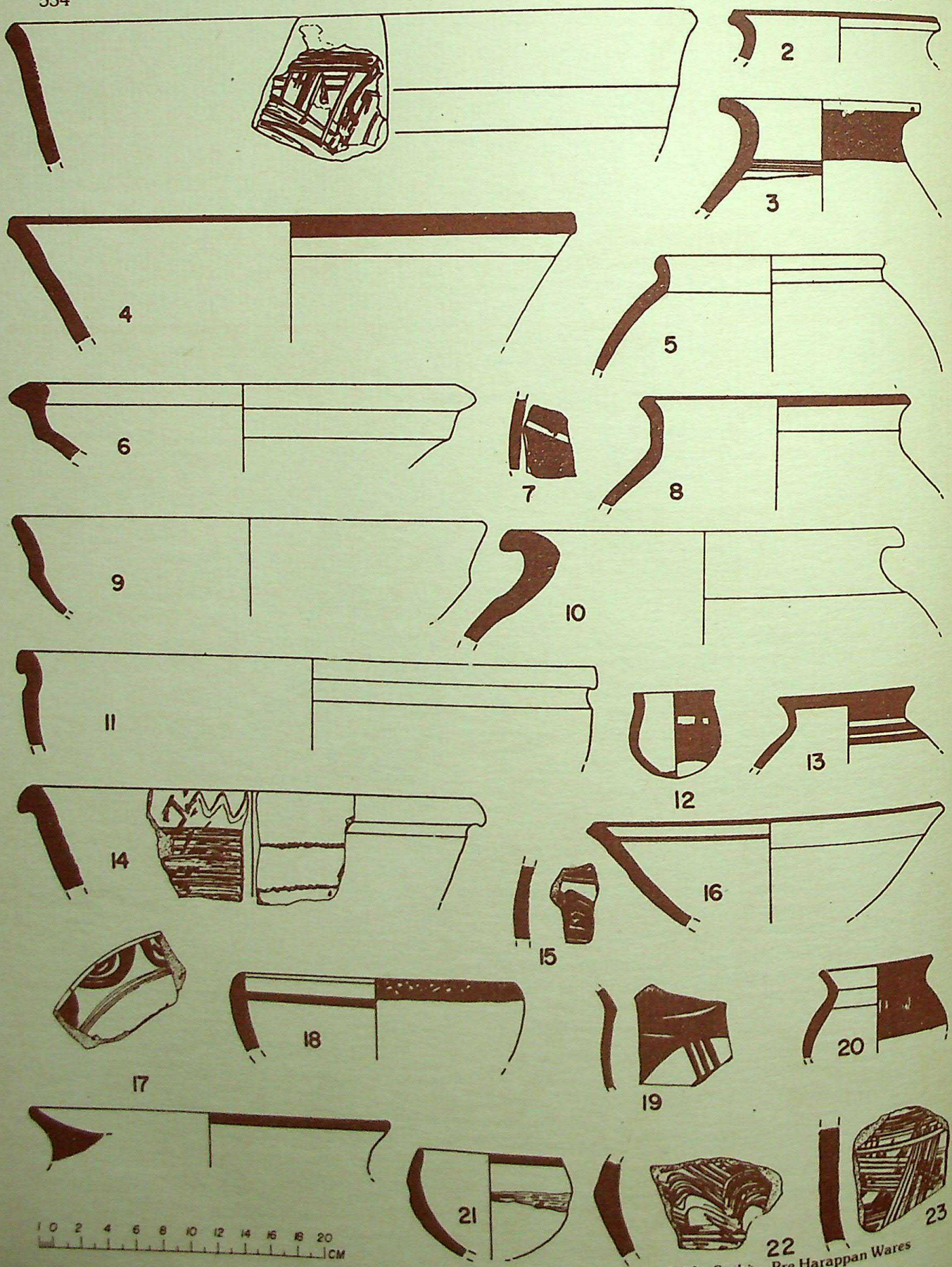


Fig. 53.3: Sothi: Pre Harappan Wares

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

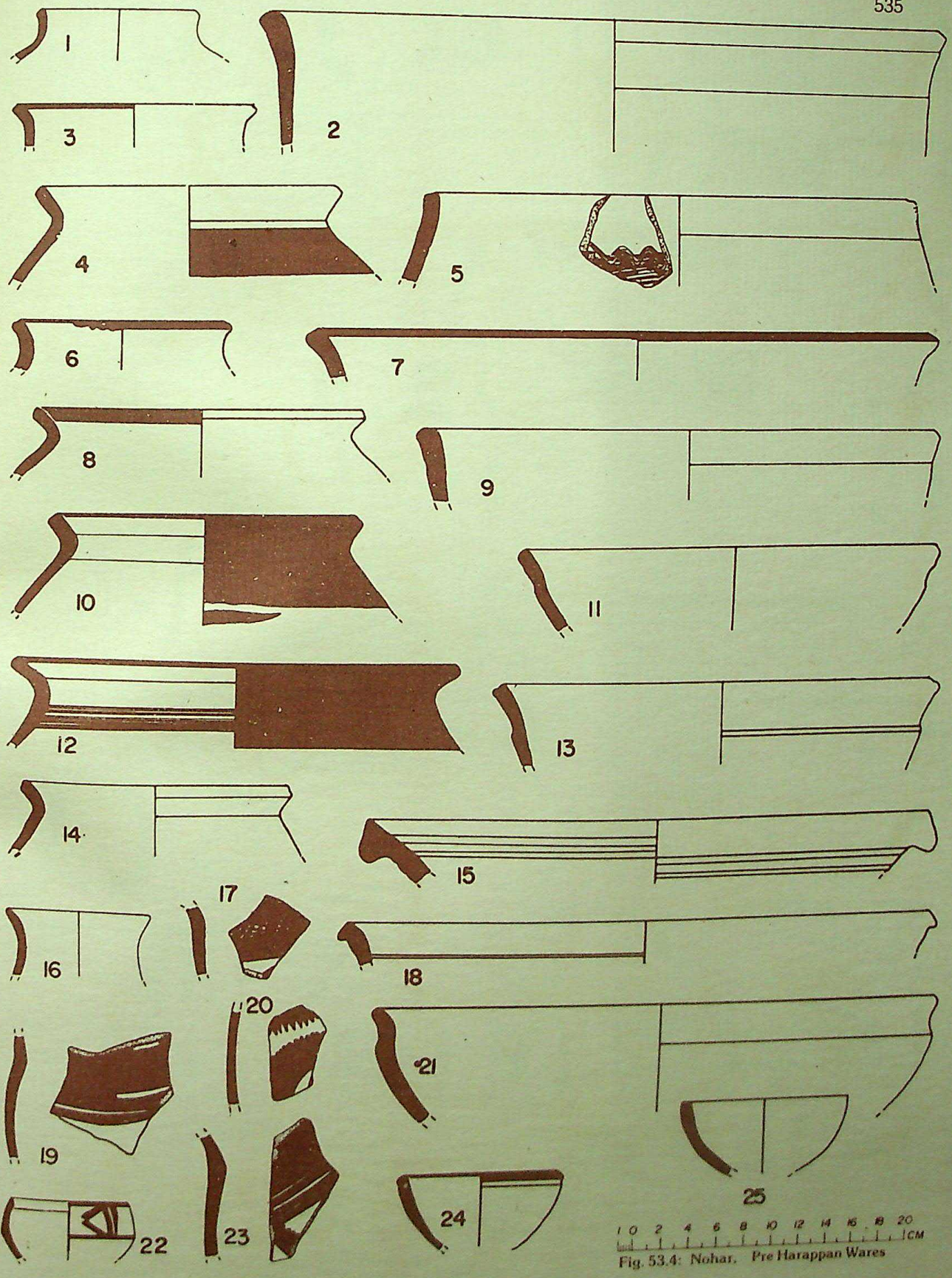


Fig. 53.4: Nohar. Pre Harappan Wares

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

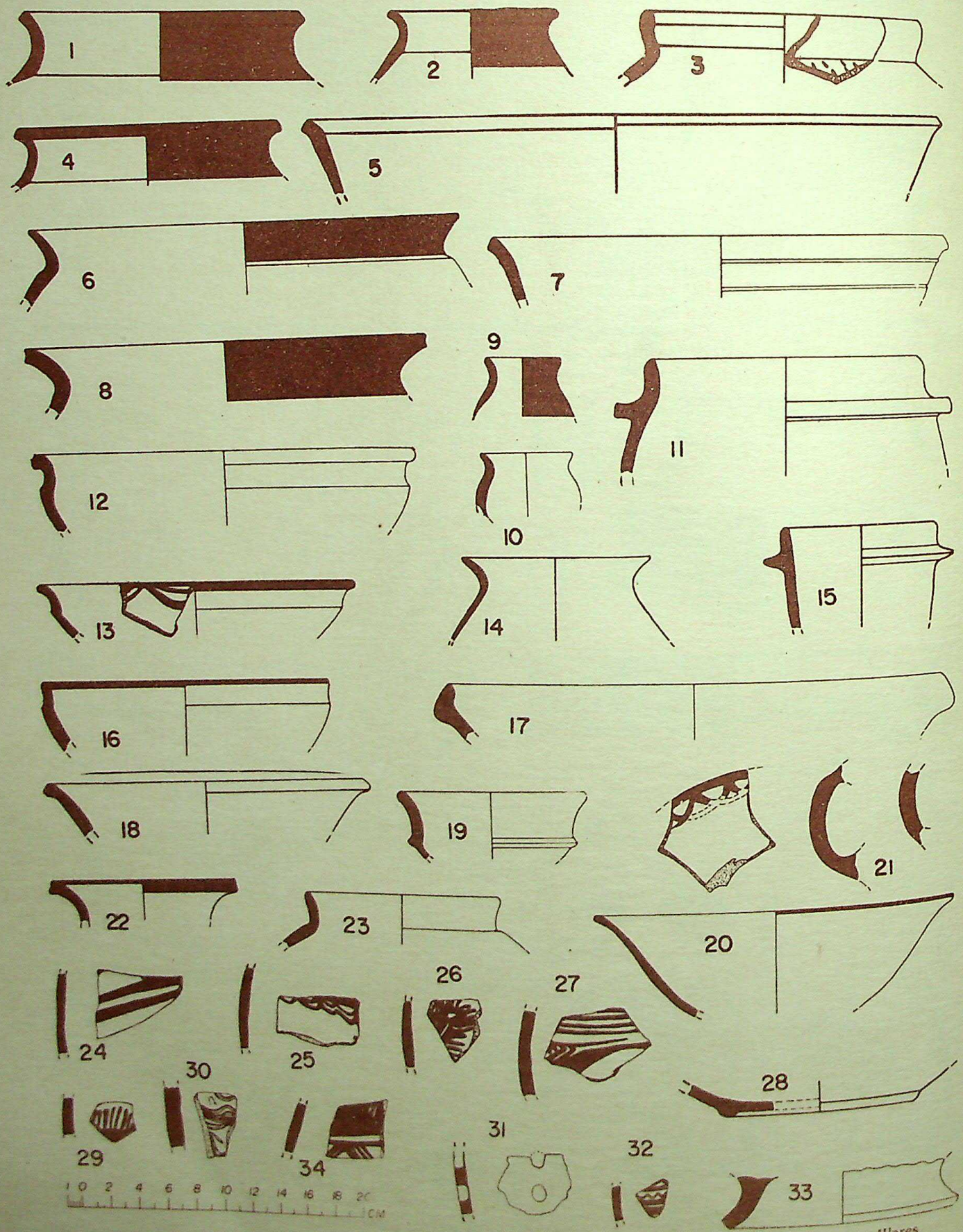
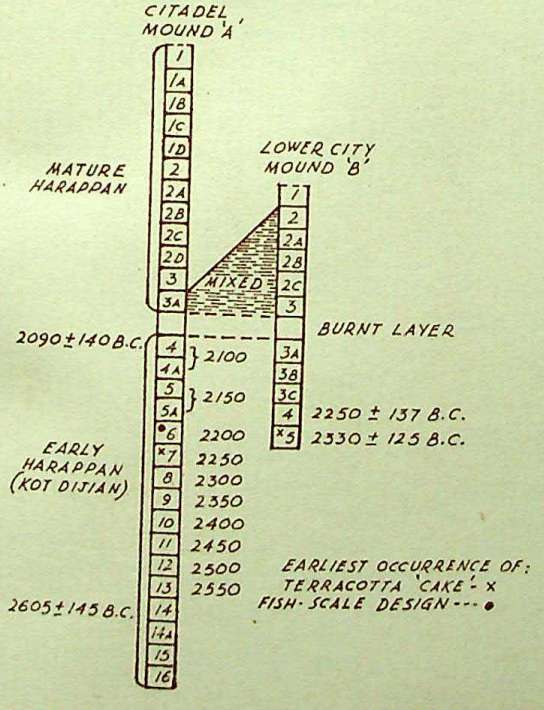


Fig. 53.5: Sherpura, Pre Harappan Wares

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

whereas at Sandhanwala Ther and Kalibangan there is a clear-cut hiatus between the Sothi and the Harappan levels. Ghosh has been of the view that a firm Sothi sub-stratum is obvious in the make-up of Harappa—much firmer than that of the other earlier cultures (Ghosh 1975:116). However, it is difficult to assess the quantum of contribution of Kalibangan-Nohar-Sothi matrix in the make-up of the Harappa Culture since there has also been some significant changes in the cultural equipment of the mature Harappans.

In India the Sothi Ware may not represent the 'Early' Harappan phase. The bichrome Sothi fabric and brick ratio (1:2:3) did not find any place in the Harappan complex. At Kot Diji, it may, however, be noted the pre-Harappan and Harappan brick ratio are the same (1:2:4). Moreover, being late in the heirarchy of development pre-Harappan cultures, Sothi cannot be placed in the group of Early Harappan culture, Sothi Ware has been reported in the late levels of Kot Diji at Sarai Khola. Further, Fabric C and E of Kalibangan and Sothi are found at 'mature' Harappan sites. Similarly, Fabric F, the grey ware, is nearer to the Harappan grey ware (Lal: 1980). Sothi, therefore, appears to be contemporary of the 'mature' Harappan in the Indus Valley as was long time ago clearly demonstrated by Gupta (1970) on the basis of stratigraphy and chronology **(fig. 53.6)**. The Sothi pot-forms from Nohar and Sherpura also attract the same observations **(fig. 53.4,5)**.



SCHEMATIC CORRELATION OF STRATIGRAPHIC SEQUENCES AT KOT DIJI (After Mughal)

NOTES

1. The site of Sothi was explored by the late A. Ghosh in 1951–52. He had examined the material brought by the author from Sothi, Nohar and Sherpura in January 1978. He also supplied his own data for making this study.

REFERENCE

Dalal, K.F. 1980. A Short History of Archaeological Explorations in Bikaner and Bahawalpur along the 'Lost Saraswati' River, *Indica*, 17, No. 1, 4–40.

Dikshit, K.N. 1980. A Critical Review of the Pre-Harappan Cultures, *Man and Environment*, Vol. IV, 32–43.

——— 1979. Old Channels of the Ghaggar in Rajasthan—Revisited, *Man and environment*, Vol. III, 105–106.

Ghosh, A. 1965. The Indus Civilization: Its origin, authors, extent and chronology, *Indian Prehistory:* 1964, Pune, 113–156.

——— 1952. The Rajputana Desert—Its archaeological aspect, *Bulletin of the National Institute of Sciences of India*, No. 1, 37–42.

Gupta, S.P. 1978. Origin of the Form of Harappa Culture: *A New Proposition, Puratattva*, No. 8, 141–46.

——1972. In Omi Manchanda's *A study of the Harappan Pottery*, New Delhi. Appendix.

Lal, B.B. 1980. Kalibangan and the Indus Civilization, *Essays in Indian Protohistory*, D.P. Agarwal and Dilip K. Chakrabarti, ed., New Delhi, 65–67.

Mughal, M.R. 1975. the Early Harappan Period in the Greater Indus Valley and Northern Rajasthan, *Microfilm, Michigan University*, USA, 95–123.

Stein, A. 1943. an Archaeological tour along the Ghaggar-Hakra. River, 1940–42, *Microfilm, American Documentation Institute, Library of Congress*, Washington, USA.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Appendices

I
DATING THE INDUS CIVILIZATION

The chronology of the Indus Civilization is not now as problematic as it had been a few decades ago. Besides, extensive excavations in the Indian sub-continent and its borderlands have brought to light earlier cultural levels, some exhibiting links with the Indus Valley. As a result, scholars have now divided the period of the Indus Civilization into two, namely the Early Indus (sometimes also called Pre-Harappan or even 'Kot Diji-Sothi' Complex) and the Mature Indus cultures. The Late Harappan, which followed the Mature Harappan, also forms part of the Indus Civilization.

Amri I A-D equated to Anjira III, Mundigak III, Kile Gul Muhammad III–IV, Allahdino, Balakot, Kot Diji (early phase), Damb Sadaat II–III, Mehargarh IV, Rehman Dheri, Gumla II–III, Lewan, Kalibangan I, etc. represent Early Indus Culture. Harappa, Mohenjo-daro, Kalibangan II, Lothal A, Surkotada, etc. would belong to the Mature Indus Culture. Jhukar, Harappa 'Cemetery H', Alamgirpur, Hulas, Lothal B, etc. fall into the category of Late Harappan culture.

Previous to the innovation of Radiocarbon dating, the chronology of this civilization was determined by the conventional, stratigraphic and associated finds methods, particularly taking into account similar identifiable artefacts from West Asia, Soviet Central Asia and Afghanistan. Thus Marshall, the excavator of Mohenjo-daro, relying on the artefactual affinities with Mesopotamia placed the Indus or Harappan culture within a time bracket of 3250–2750 B.C. C.J. Gadd, basing on the analysis of Indus and Indus like seals found in Mesopotamia, particularly at Ur, brought down the date to 2350–1700 B.C. Wheeler, on the same conventional basis, assigned 2500–1500 B.C. Albright thought that the culture ended by 1700 B.C. Evidence of long distance trade exemplified by a Persian Gulf Seal (belonging to Bahrain), found at Lothal, etched cornelian beads, exported from Indus region (found at Tell Asmar by Frankfort), a stamped potsherd with Indus characters found Tepe Yahya, an inscribed potsherd located on the Oman's coast, two Indus seals (one inscribed) found at Altin Depe, and one inscribed Indus seal found at Shortughai, all during the last one decade or so, also find favour with the mid to late third millennium B.C. date for this culture with a maximum active life of about four to five centuries.

So far as to the conventional dating methods. Let us now turn to Radiocarbon dates of this culture in its Early and Mature phases, for the Late Harappan there are only a few dates. The dates are based on half-life 5730. Only two dates, earliest and latest, of the available dates are considered. We are also giving corrections according to Tables given by Ralph *et.el.* In Possehl (1979) which is now widely used with great justification.

Early Indus

Radiocarbon		MASCA
Amri		
TF 863	2665 ± 110	3160 B.C.
TF 864	2900 ± 115	3540 B.C.
Damb Sadaat		
P. 523	2200 ± 75	2630–2670 B.C.
P. 522	2550 ± 200	3150 B.C.
Gumla		
P. 1812	2248 ± 74	2700–2820 B.C.
P. 1882	2382 ± 151	2920–2940 B.C.
Kot Diji		
P. 195	2100 ± 140	2550 B.C.
UW	2600 ± 145	3180 B.C.
Balakot		
UCLA 1924 D	2386 ± 82	2930–2950 B.C.
Kalibangan		
TF 154	1820 ± 115	2140 B.C.
TF 155	2370 ± 120	2920–2940 B.C.

Mature Indus

Ghaligai		
R 3780	1923 ± 55	2180 B.C.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Mohenjo-daro		
TF 75	1755 ± 115	2110 B.C.
P. 1177	2155 ± 65	2600 B.C.
Kalibangan		
TF 143	1665 ± 110	2040 B.C.
TF 160	2230 ± 105	2690–2800 B.C.
Lothal		
TF 10	1800 ± 140	2120–2140 B.C.
TF 136	2080 ± 135	2490–2540 B.C.
Surkotada		
TF 1304 & 1309	1805 ± 90	2120–2140 B.C.
PRL 85	2315 ± 135	2880–2900 B.C.

It will be seen from the above that the Radiocarbon (without MASCA correction) range from 2900 B.C. to 2100 B.C. roughly for the Early Indus. Dates for the Mature Indus period range between 2200 B.C. and 1800 B.C. Late Harappan was, therefore, bracketed between 1800 B.C. and 1300 B.C.

Applying MASCA correction, the date range for Early and Mature Indus periods would be roughly from 3200 to 2200 B.C. and 2700–2100 B.C., respectively. Here we have left out single extremely early or extremely late dates for obvious scientific reasons.

On the whole, the assessment of the conventional dates and Radiocarbon dates (MASCA corrected ones) do exhibit variance but MASCA corrected dates appear to tag Indus chronology with Mesopotamian chronology better.

References

Agrawala, D.P. 1982 *The Archaeology of India*, London,
Possehl, L.Gregory, (Ed.) 1979 *Ancient Cities of the Indus*, New Delhi.

—K.S.RAMACHANDRAN

II

EXPECTATIONS FROM THE EXCAVATION OF A NEW SITE OF THE INDUS CIVILIZATION

Though I had an opportunity to participate, for a brief period, in the excavation at Chanhu-daro, and pay a visit to Mohenjo-daro, as far back as 1935, I had no opportunity to carry out any excavation on a site of the Indus Civilization; whatever I know about it is at second hand. Even opportunities to handle the original antiquities of this civilization were very few.

However, during the last few years, I had occasions to go through systematically the original annual reports by Marshall and Vats on Mohenjo-daro and Harappa, respectively, as well as their general accounts on the same which, to my mind, are far from satisfactory. Wheeler's accounts of his excavations at Harappa and Mohenjo-daro, though brilliantly written, again leave out many desirable details. Wheeler's successors in the Archaeological Survey have been influenced by his methods and views, which even during Wheeler's time were not 'modern' as such; from European standards, in any case.

But being a small man, compared to these giants, I am interested in small things and details which will throw light on the every-day life of the Harappans, whether at Harappa, Mohenjo-daro, Chanhu-daro, Lothal, Kalibangan or Surkotada,

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

or any where else, for that matter.

For example, I am anxious to know whether the chert blades were found in the so-called 'Citadel' area, as well as in the 'Lower Town'. What were their total number and main types? The reason for this kind of enquiry is simple. If the residents of the 'Citadel' were priests or rulers they might not require as many blades as the inhabitants of the 'Lower Town'; or 'Citadels' might contain a larger number of arrow-heads and similar other tools, meant for defence purposes.

Likewise, the Indus goblet. The reports—brief or long—harp only on their occurrence or non-occurrence; but even now, after more than sixty years, we do not know the exact purpose of this simple vessel in the life of the Harappans: whether it was used by only the the poor or ordinary citizens, or by rich and the poor, the rulers and the ruled both. For such an accurate knowledge, its occurrence has to be properly recorded. Unfortunately, eversince its first discovery, the goblet has been a type tool, and its functional significance remains yet unknown.

The same is the case with the famous large S-shaped, painted vase. I wonder if such an artistic vessel would be placed in one corner of the kitchen containing grains and other things! Would it not form a central piece in a three-or-four roomed Harappan house? How shall we know this? Evidently by ascertaining the exact position of such vessels; even of their fragments, in every part of the excavated area. This insight cannot be had if the potsherd is sent to the pottery-yard, washed there after some time, recorded by some one else, and studied by the excavtors much later. The excavator has to take extra care about the occurrence of such S-shaped vessels or their fragments. That means he has to be fully seized of its significance in the life of the Harappans.

Since the Harappan houses have several rooms (at least three with an open verandha, where cooking is supposed to have been done), with definite, well-marked boundaries (or walls), it should be possible, to have an idea about the contents of each room. For this precise knowledge, the finds (including pottery) from each room have to be kept separately and studied, preferably, each day.

In such a study attention should be given to the occurrence of terracotta and faience toys and figurines. All these years, these have been regarded as 'minor' finds. But a careful analysis of these discovered at Harappa and described by Madho Sarup Vats showed that some of the finer ones, like the serpent, squirrel, peacock, dog and bull, as well as the famous red stone male torso and the ithyphallic dancer in grey stone, were made by a composite technique. Such a technique was not so much evident in the finds from Mohenjo-daro and Chanhu-daro. Thus this technique which is quite unique, and seen so far in one neolithic site in Europe, seems to be confined to Harappa. In this all the moveable parts – such as the head, hands, feet, feathers and fangs are made separately and fixed in the grooves provided for each part.

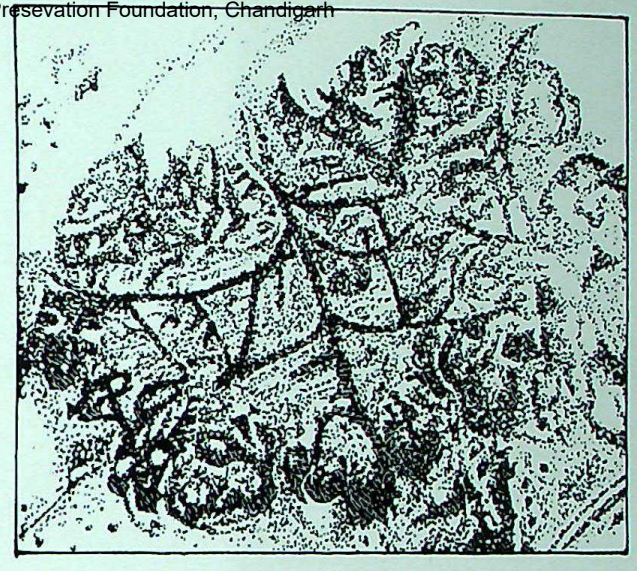
This impression could be proved or disproved by a careful study of the finds from Lothal, Kalibangan and Surkotada. I shall never have an opportunity to undertake such a study. But if a careful, day-to-day occurrence of such finds, even in a limited area selected for excavation is kept, then we might know if such composite toys were made by a special group of artists, or it was a common practice in the Harappan civilization. If there was a craft specilization, then this is the only way of finding it out. Such a careful pre-planned excavation, followed by a careful record and study of finds will give a true insight into the life of the Harappans.

Larger issues such as the nature of the civilization, its duration and chronology, the layout of the cities and defences are fairly well known. Let us now work out the various aspects of the daily life in detail.

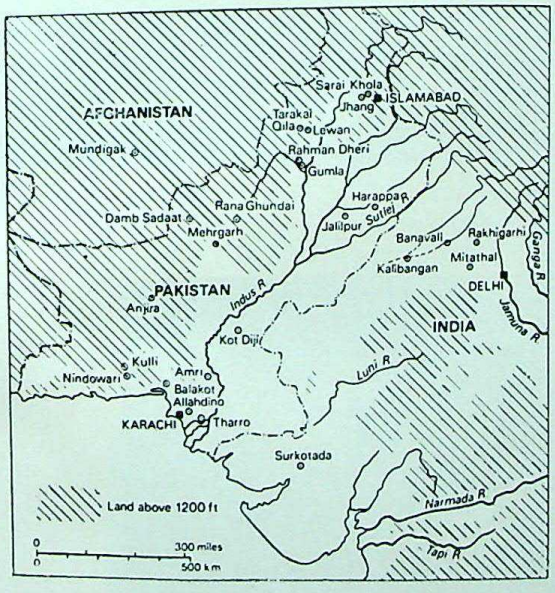
– H.D. SANKALIA

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

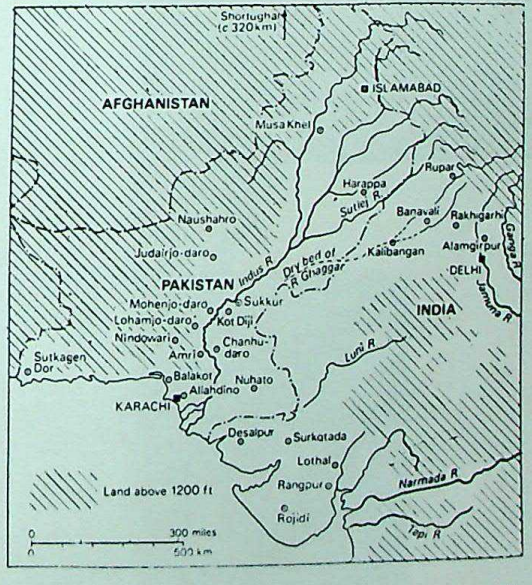
1



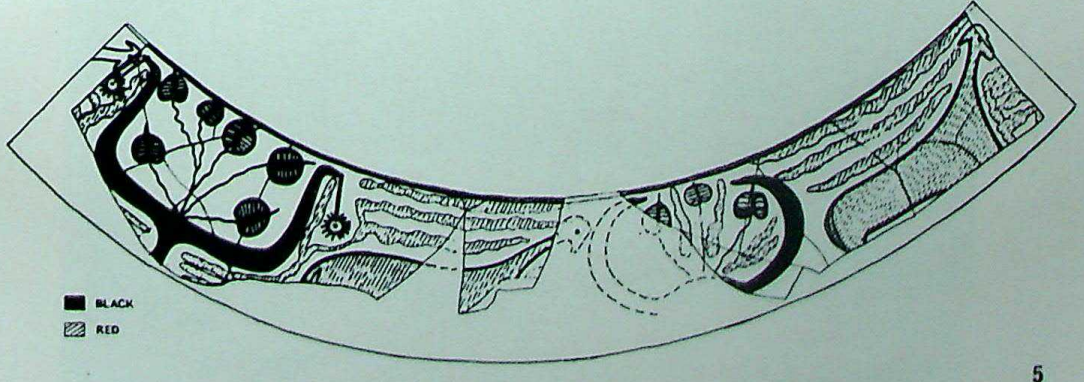
2



3

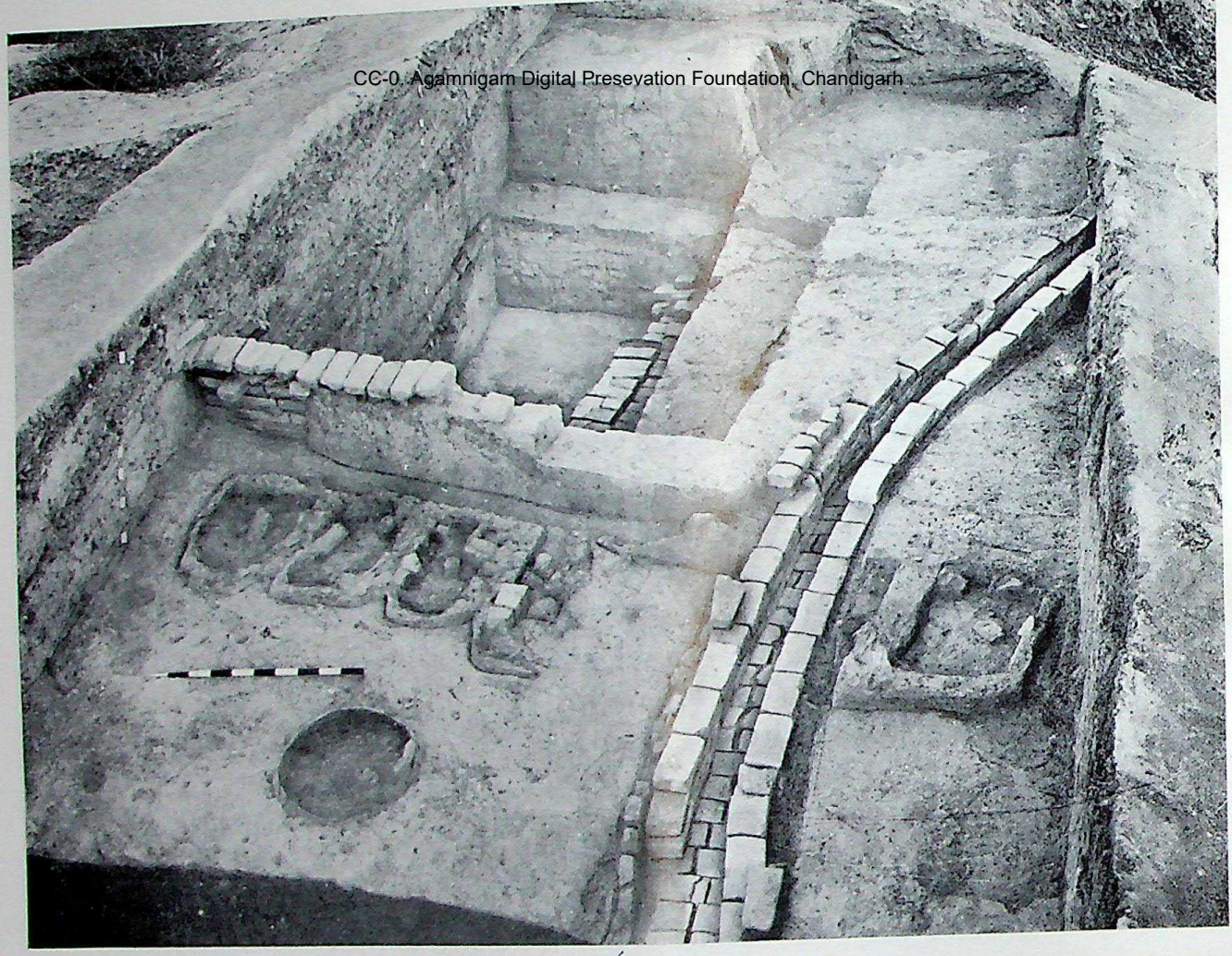


4

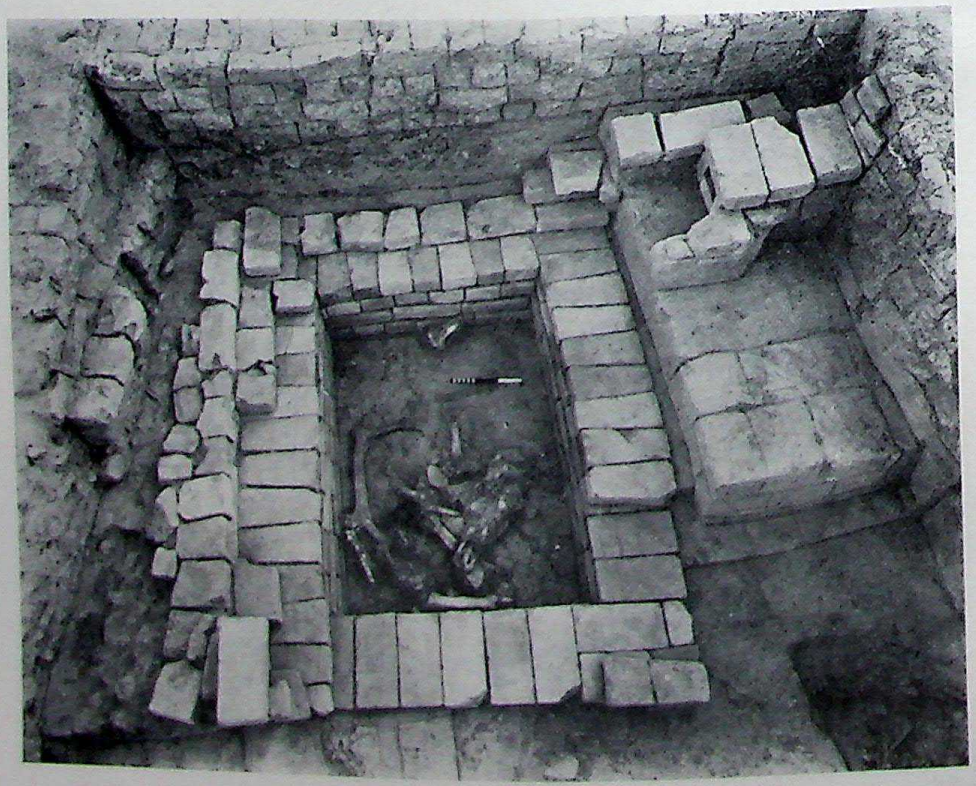


5

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



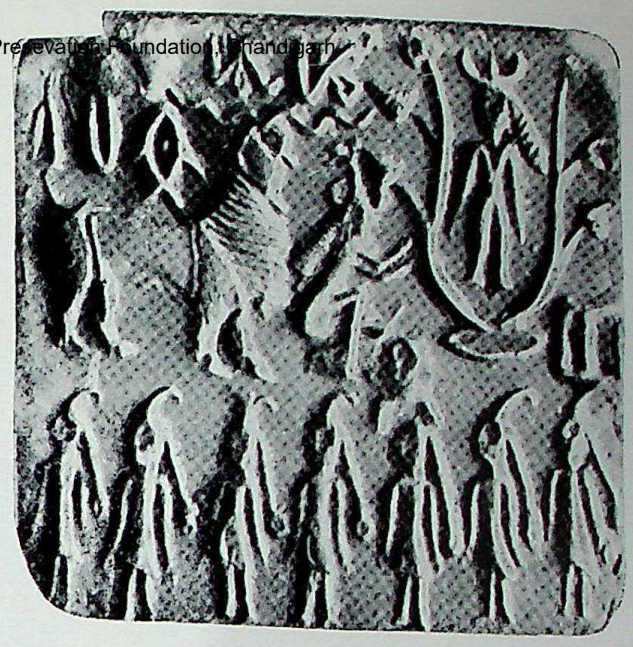
6



7

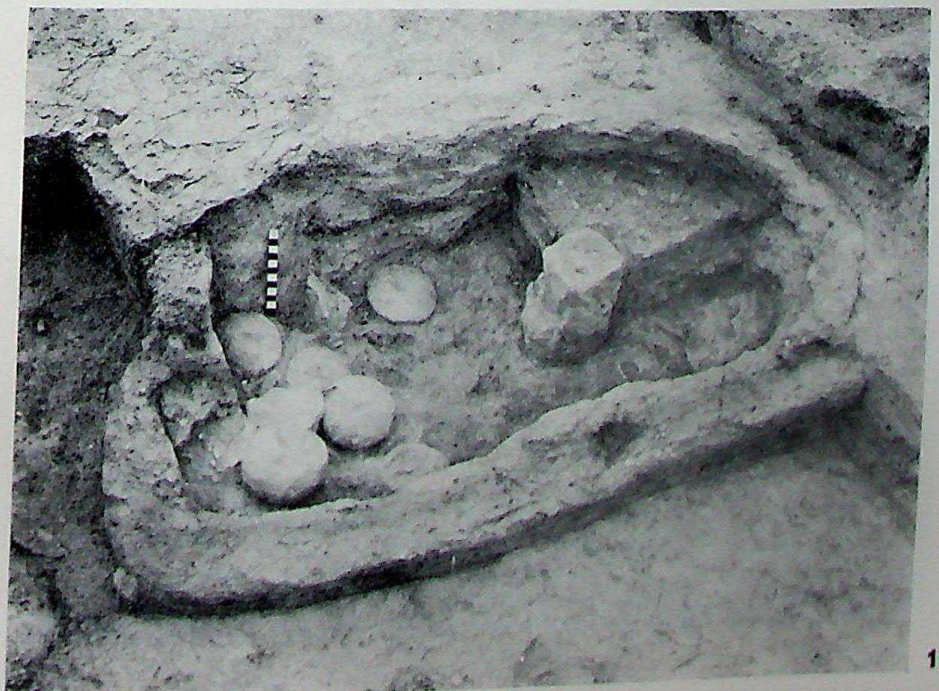
CC-0. Digital Preservation Foundation, Chandigarh

8



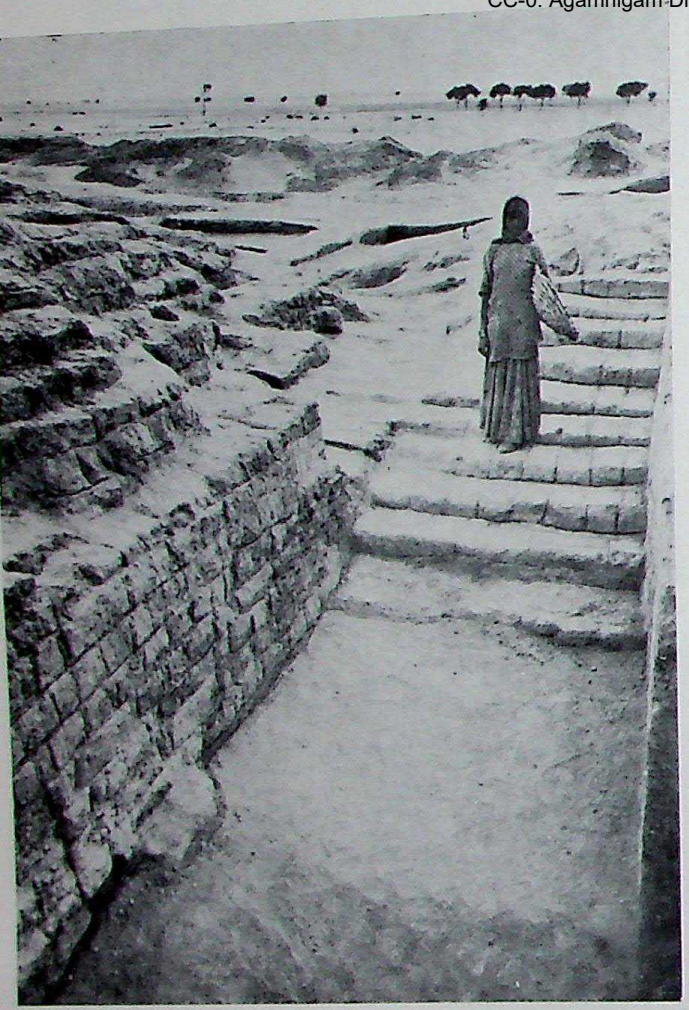
9

10



11

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

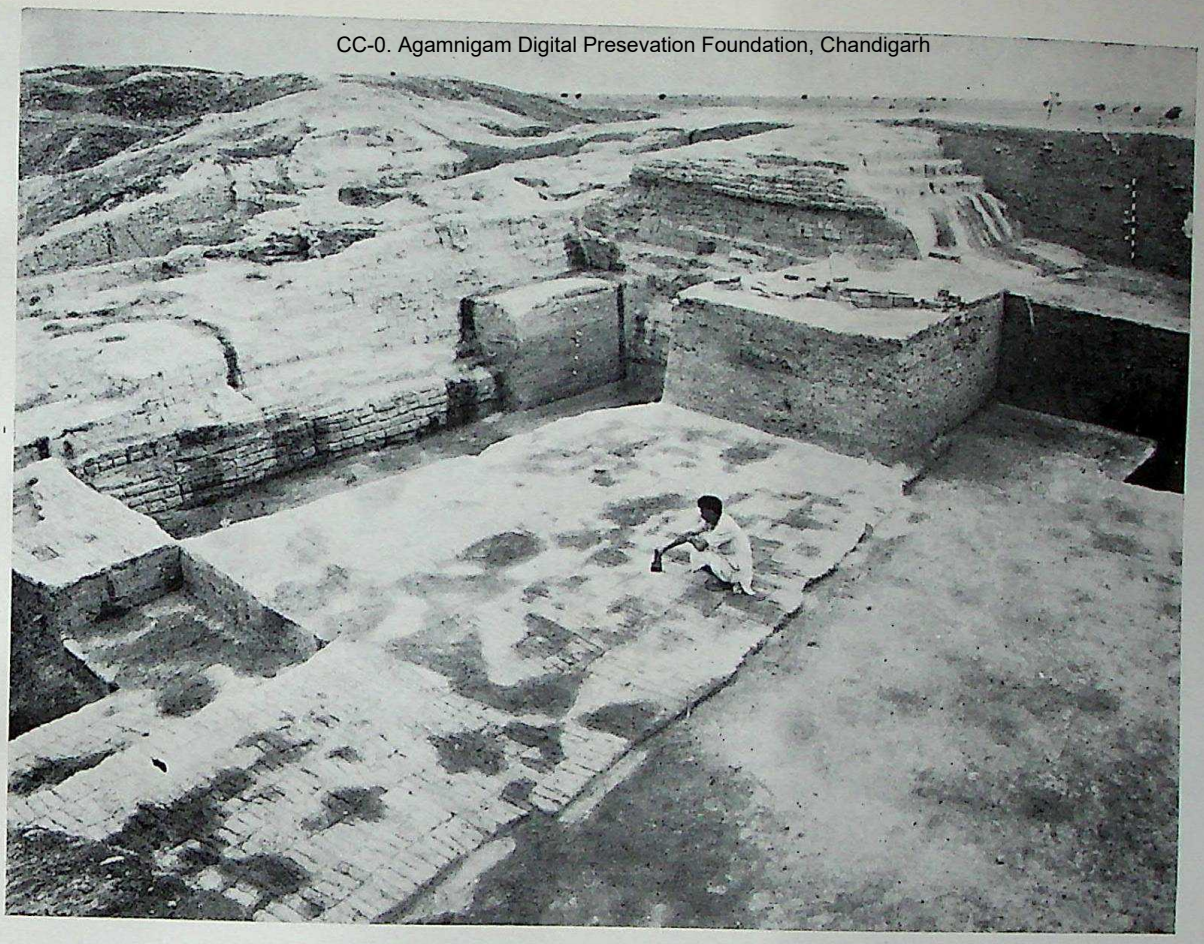


12

14

13

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

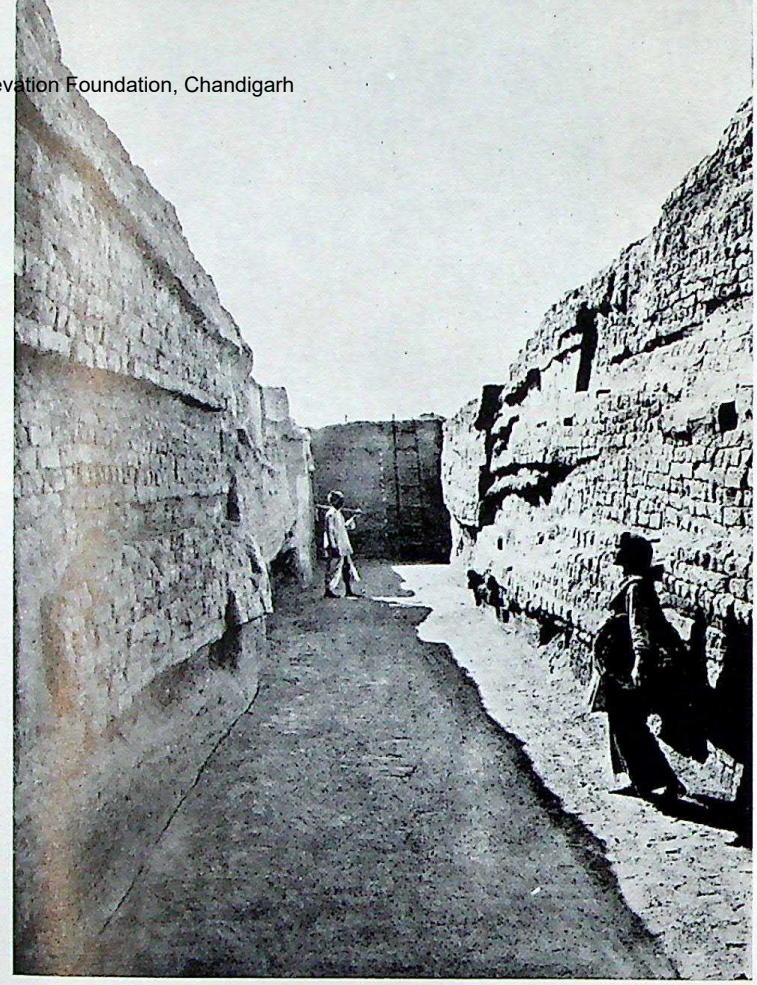


15

16

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

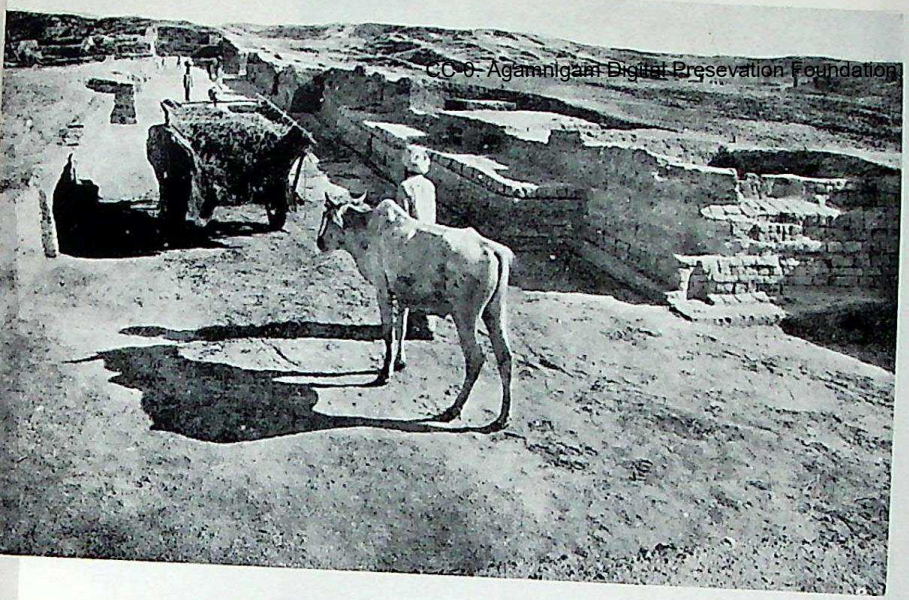
17



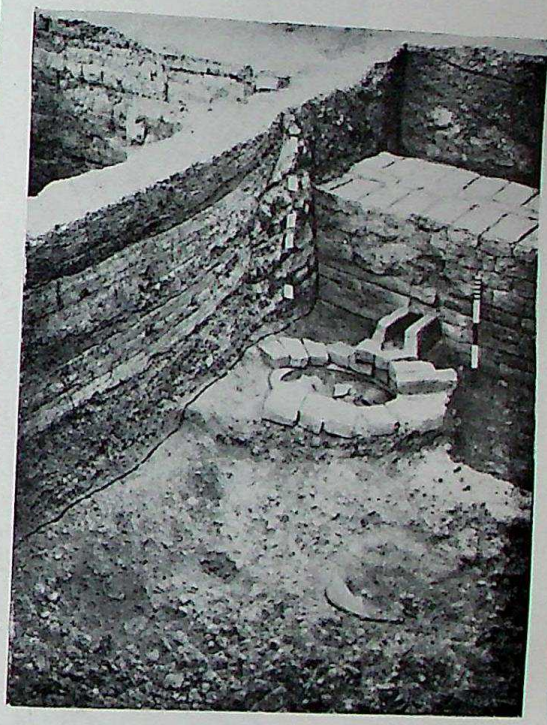
19

18

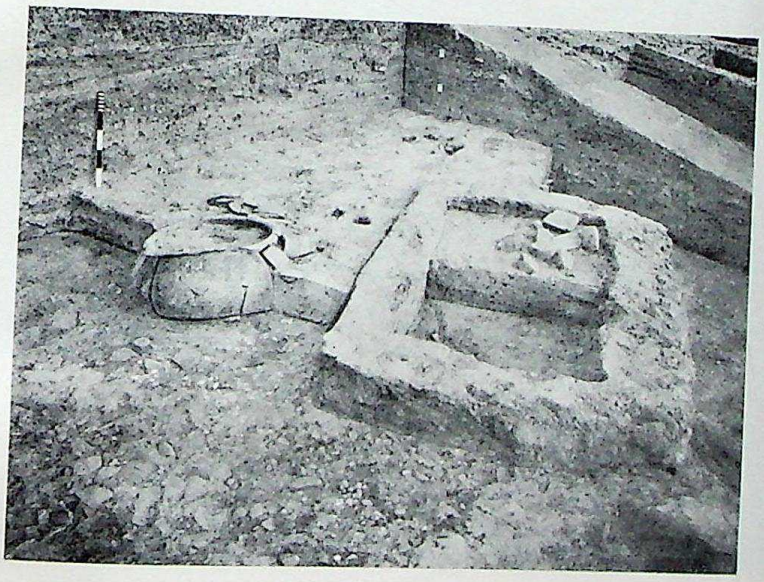
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



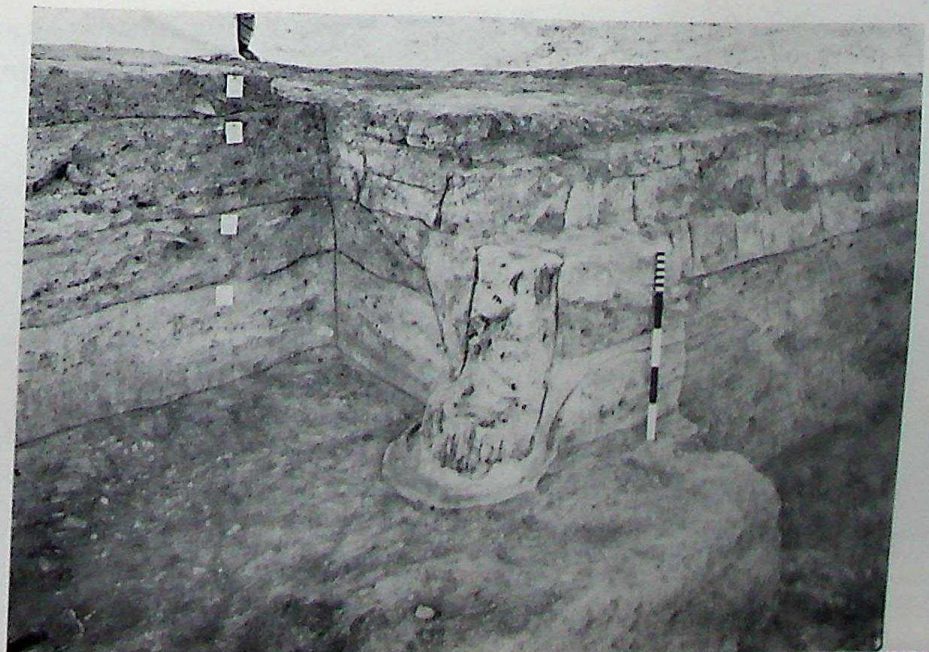
20



22



23



21

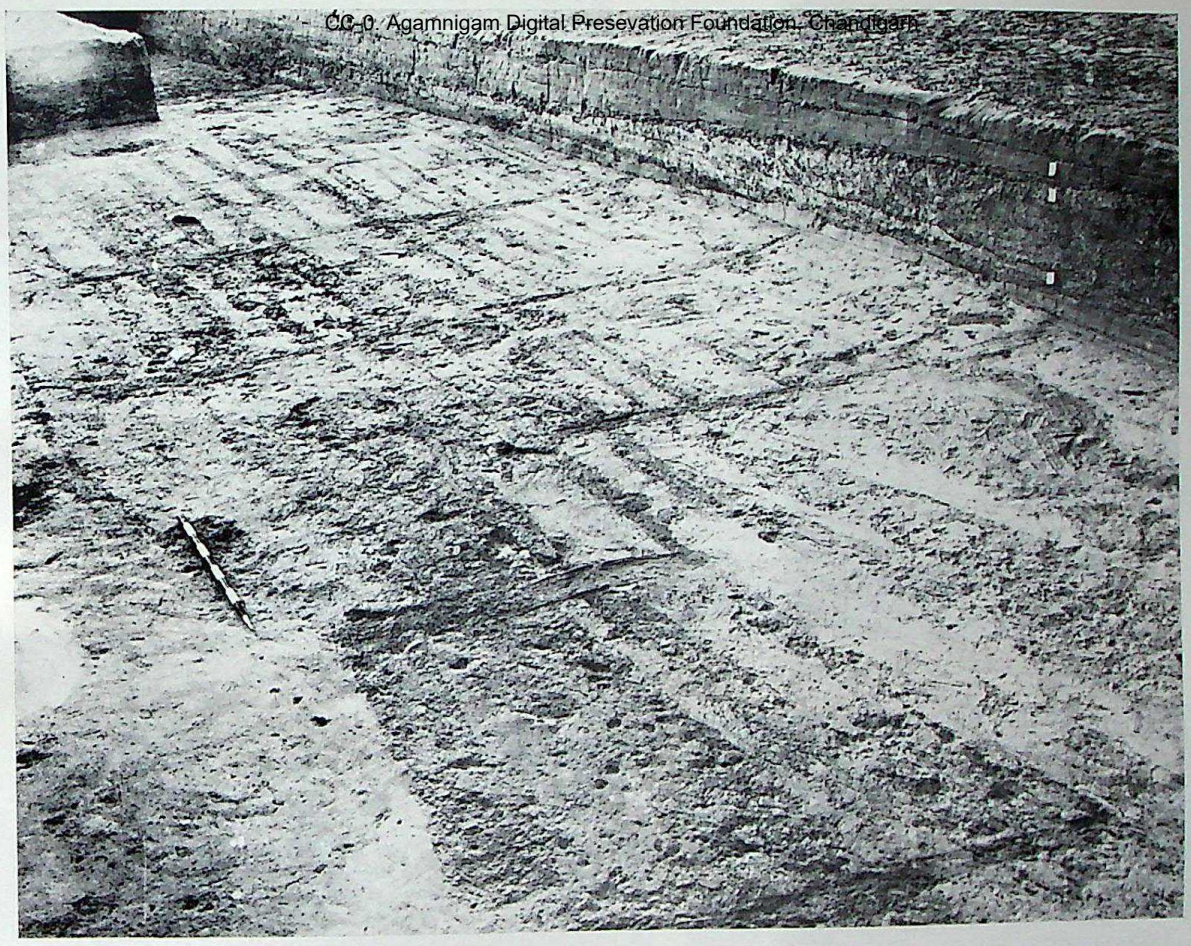
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

26

24

25

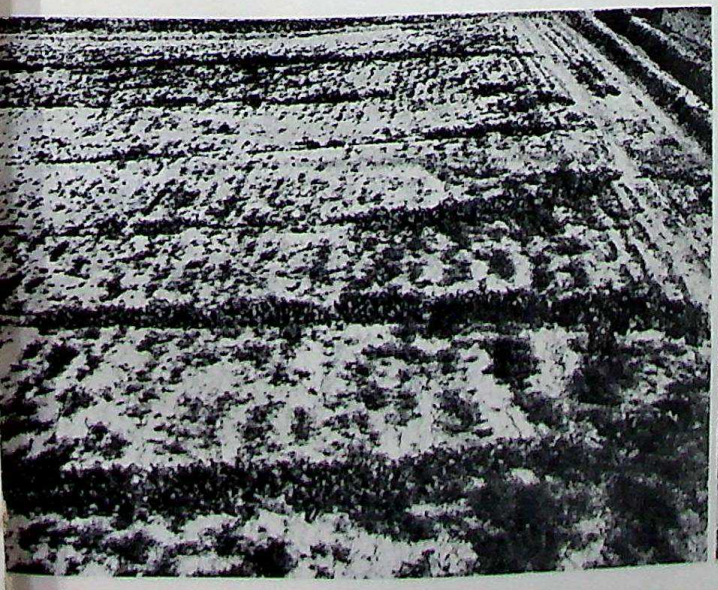
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



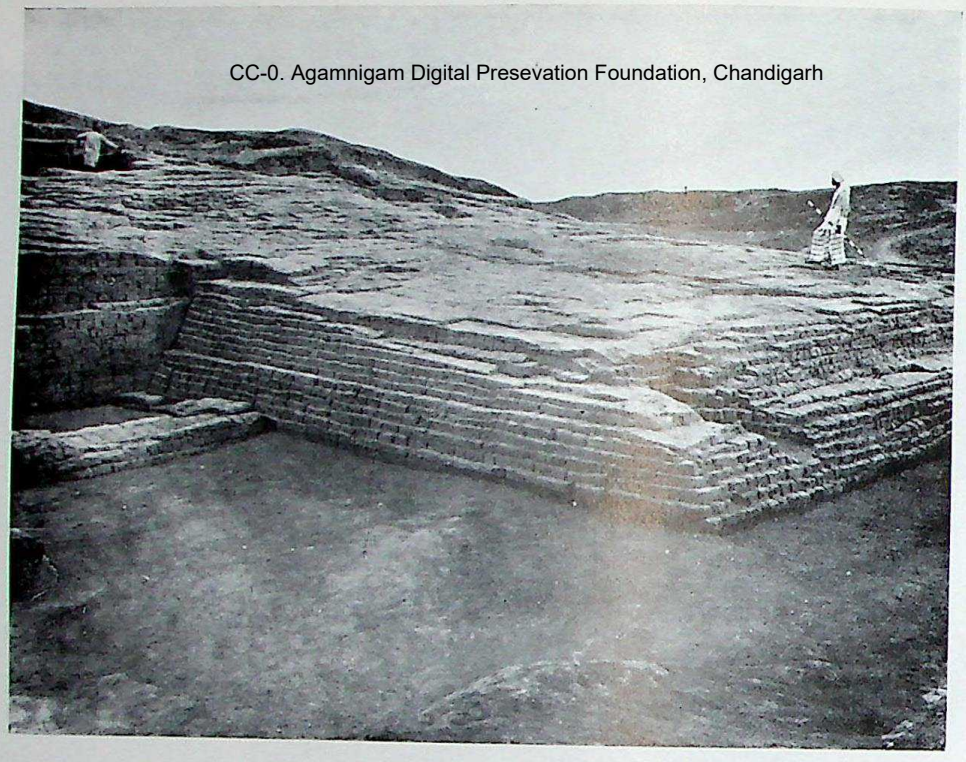
27

29

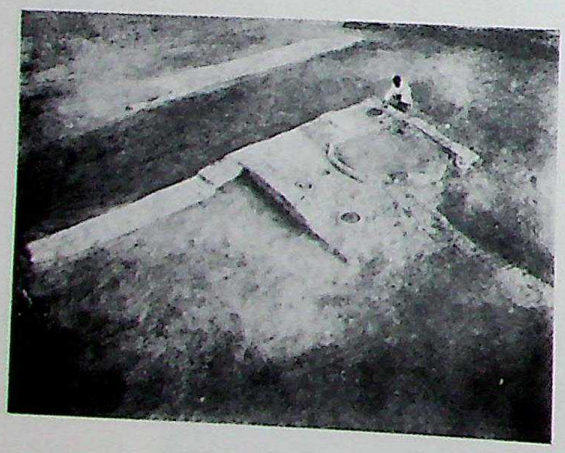
28



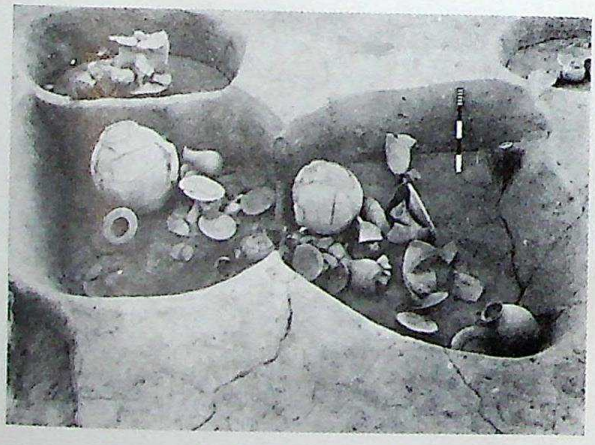
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



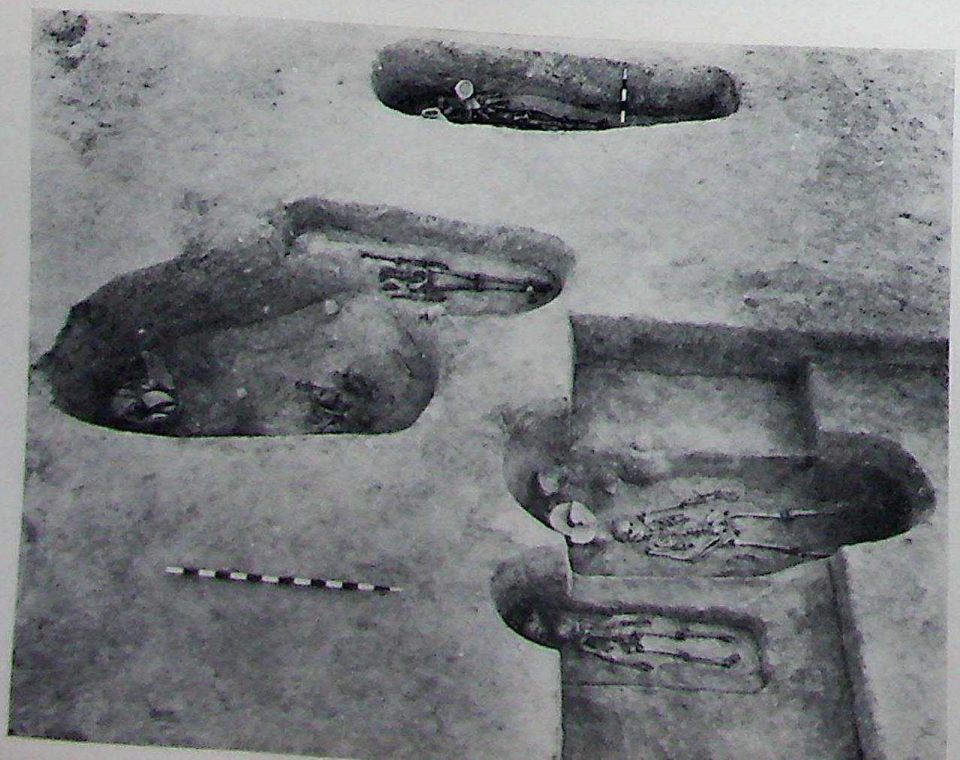
30



31

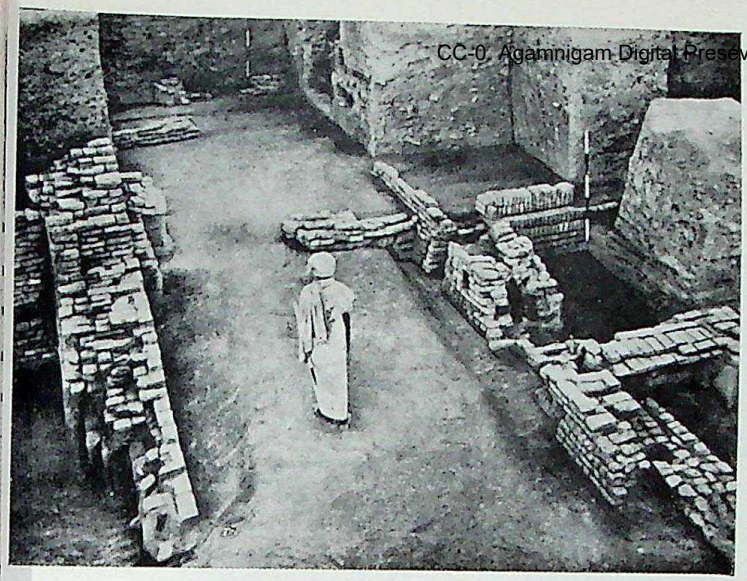


32

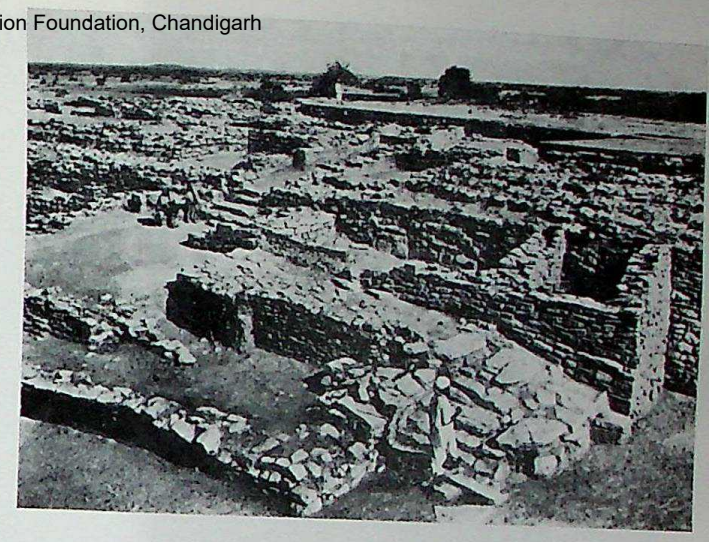


33

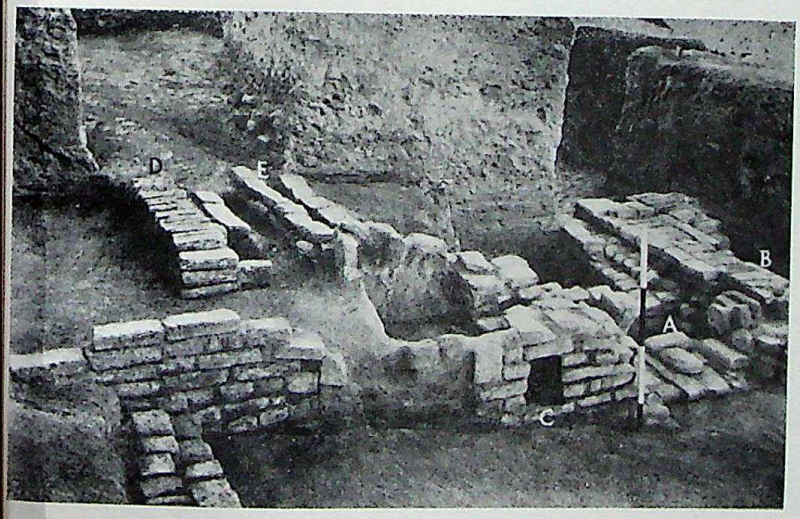
CC-0. Agamnigam Digital Preservation Foundation, Chandigarh



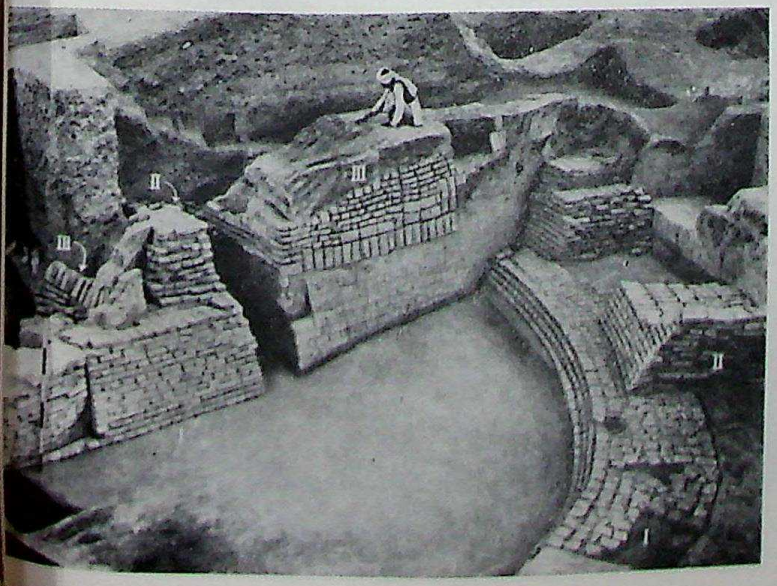
34



38



35



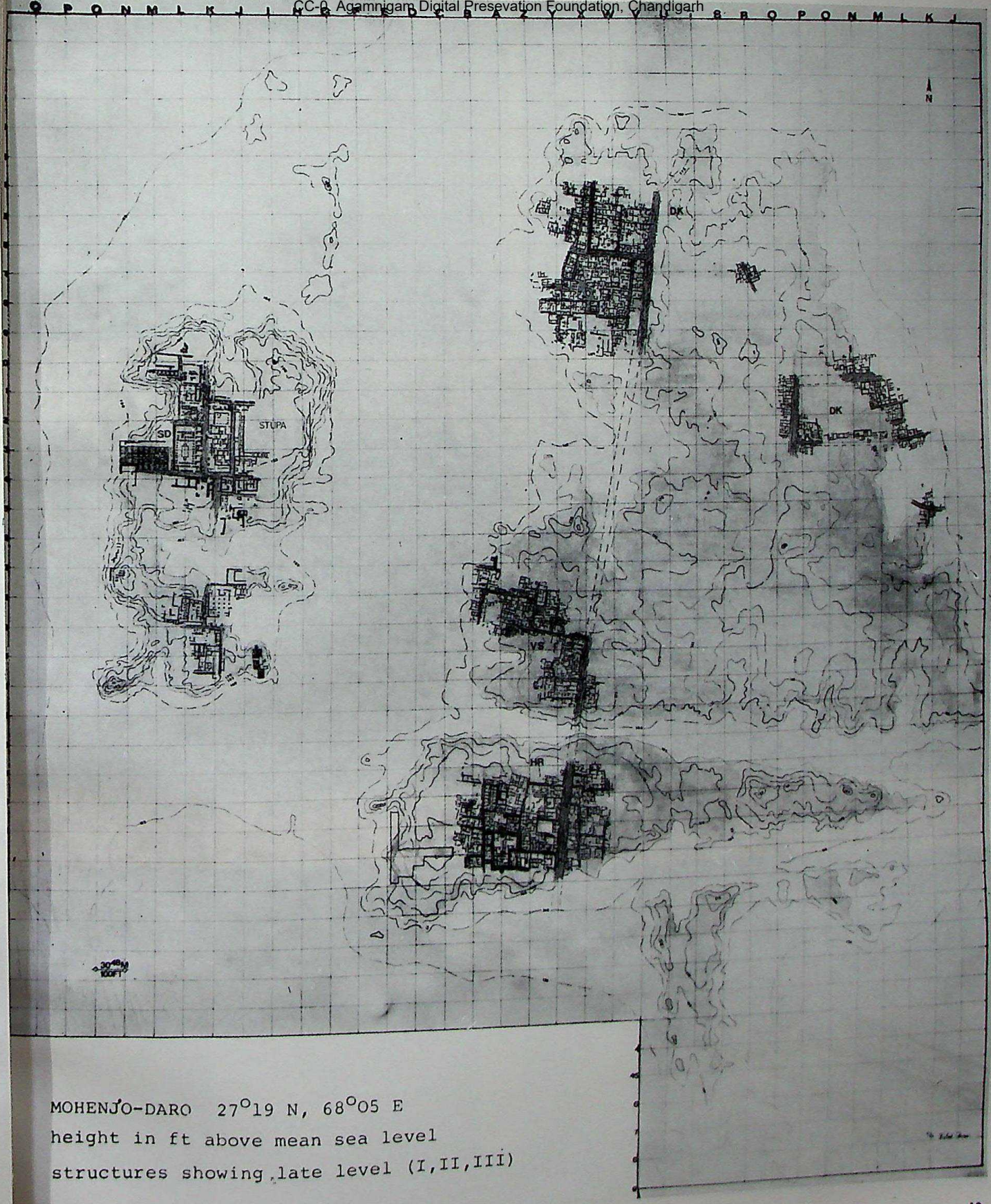
37

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

39 A

39 B

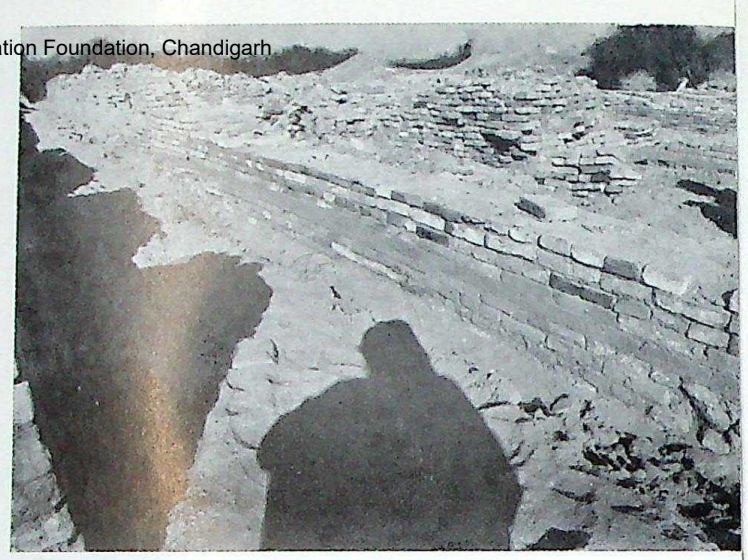
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



MOHENJO-DARO 27°19 N, 68°05 E
height in ft above mean sea level
structures showing late level (I,II,III)

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

41



4

43

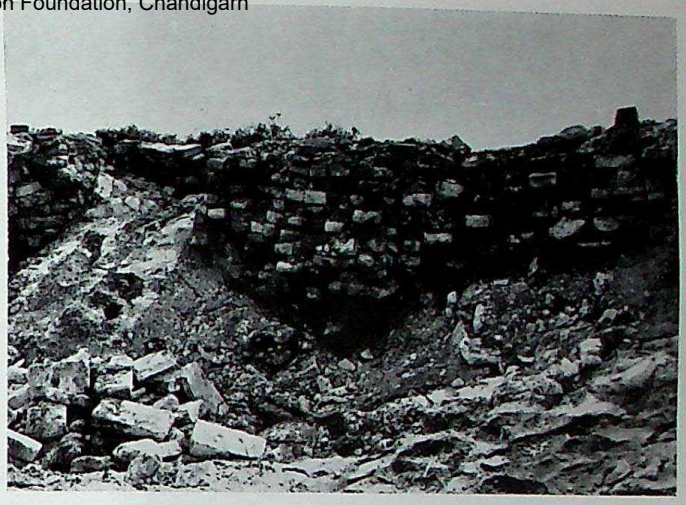
44

45

46

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

47



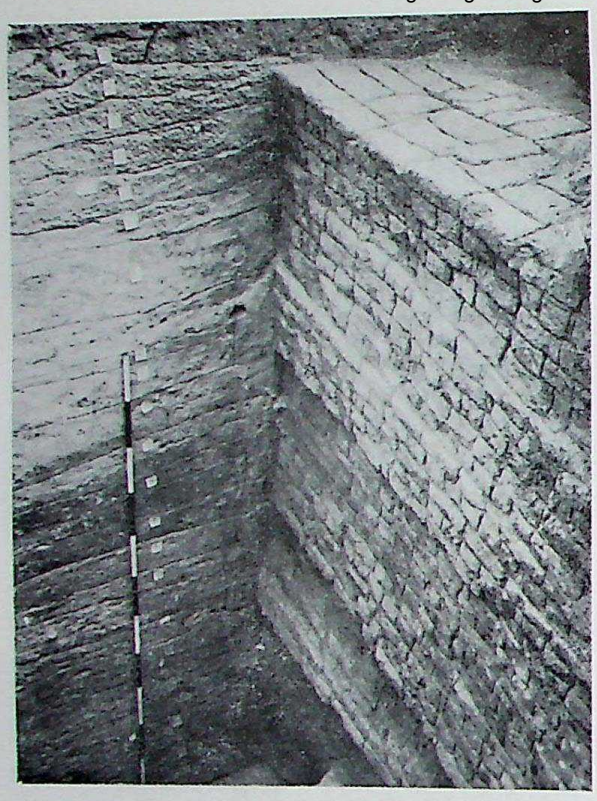
48

49

50

51

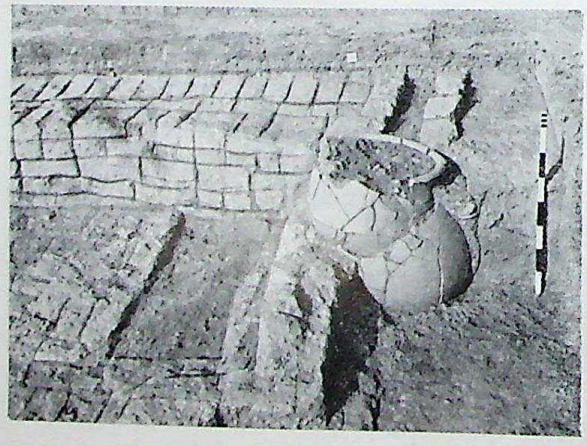
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



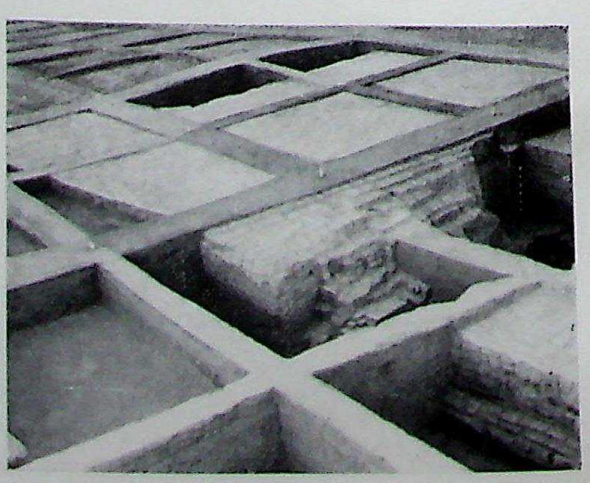
52

53

54



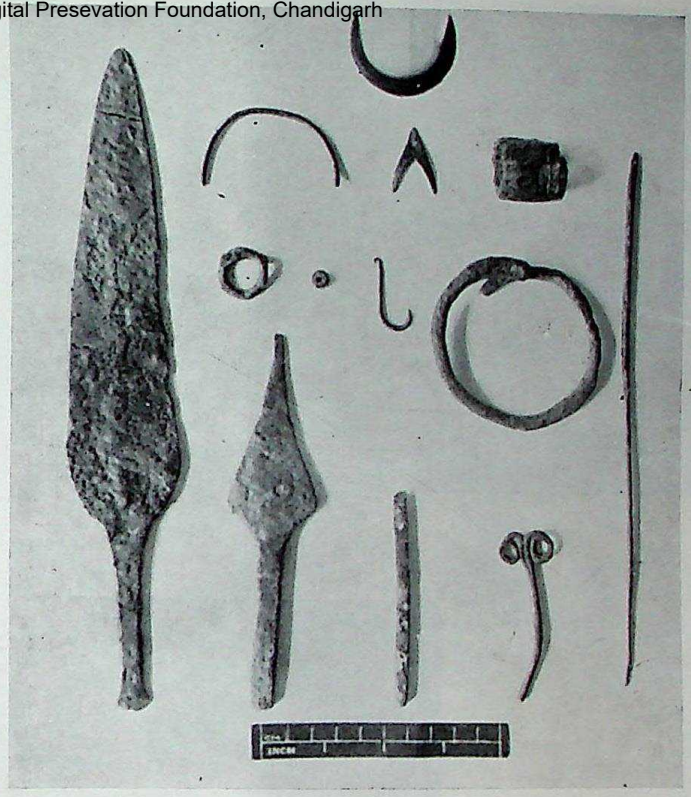
55



56

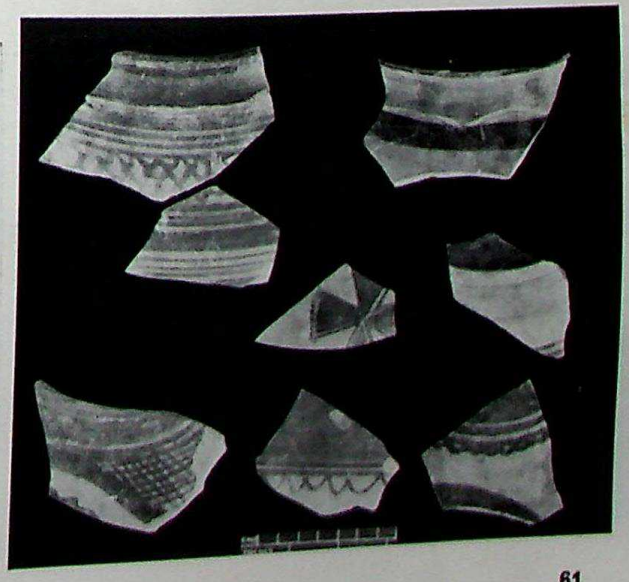
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

57



59

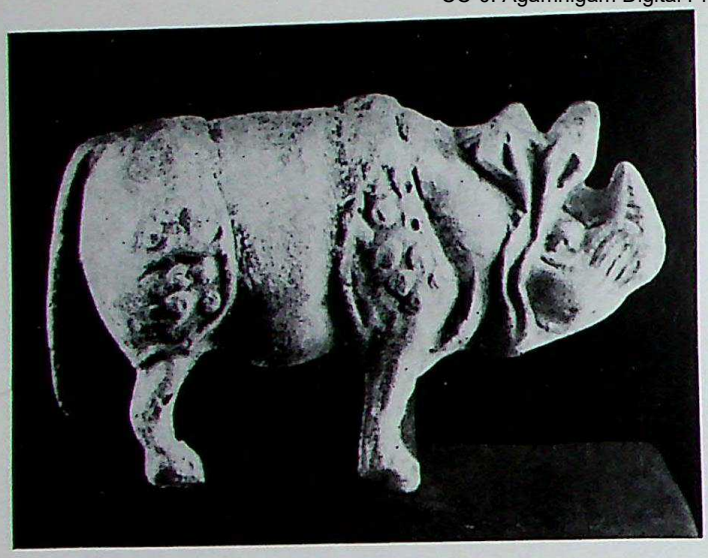
58



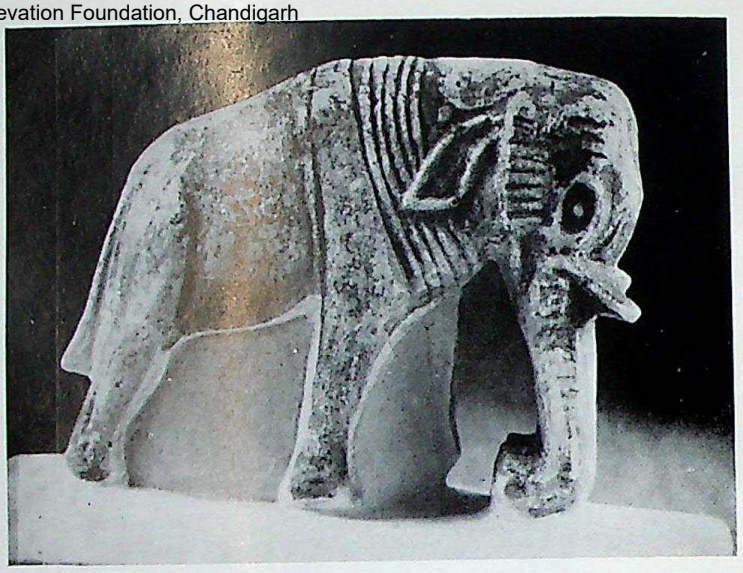
61

60

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

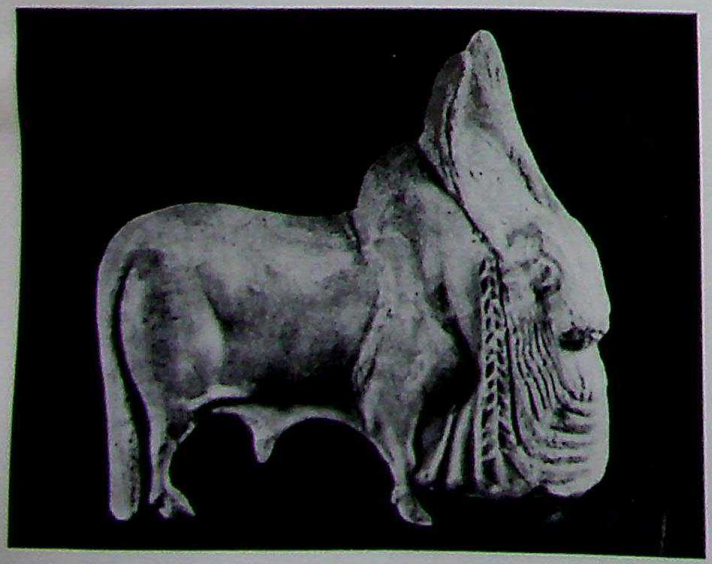


62



63

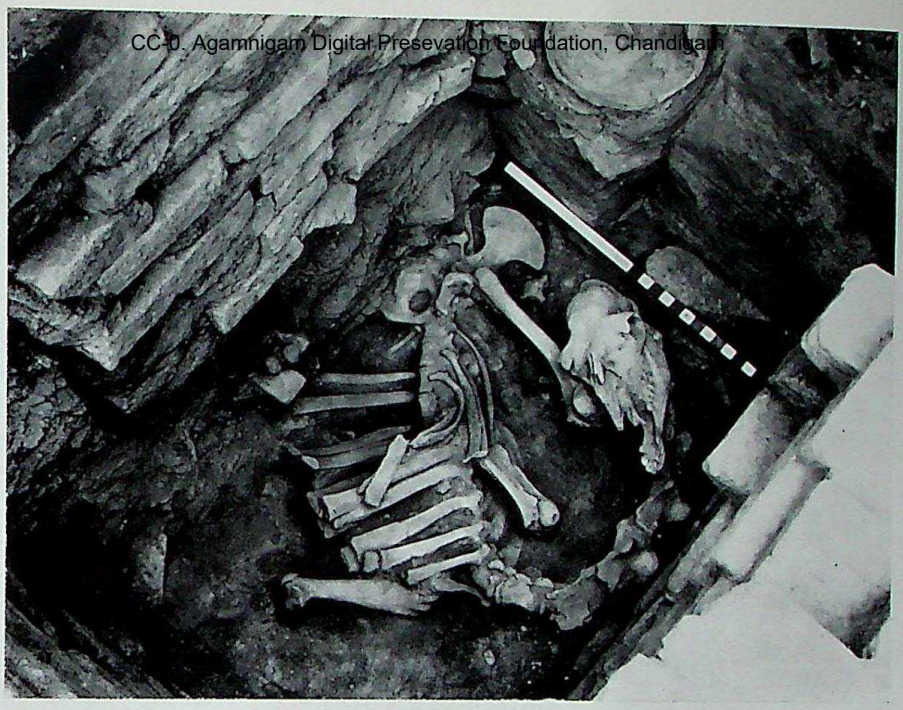
64



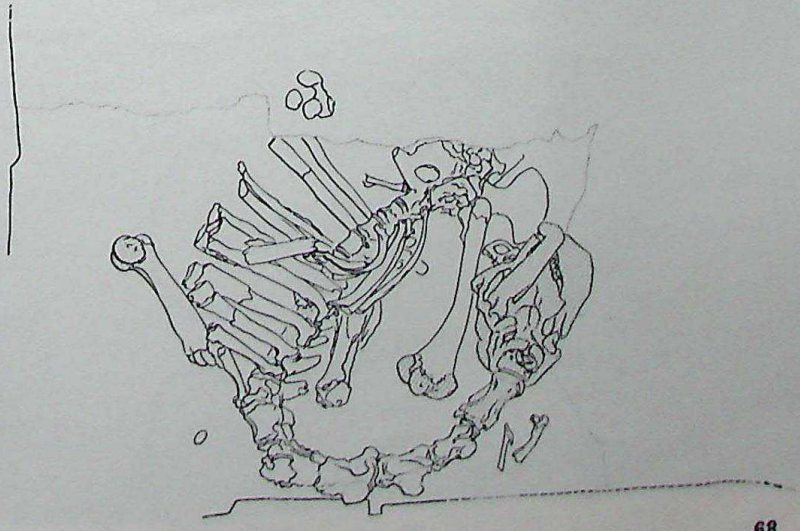
65

66

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



67



68

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

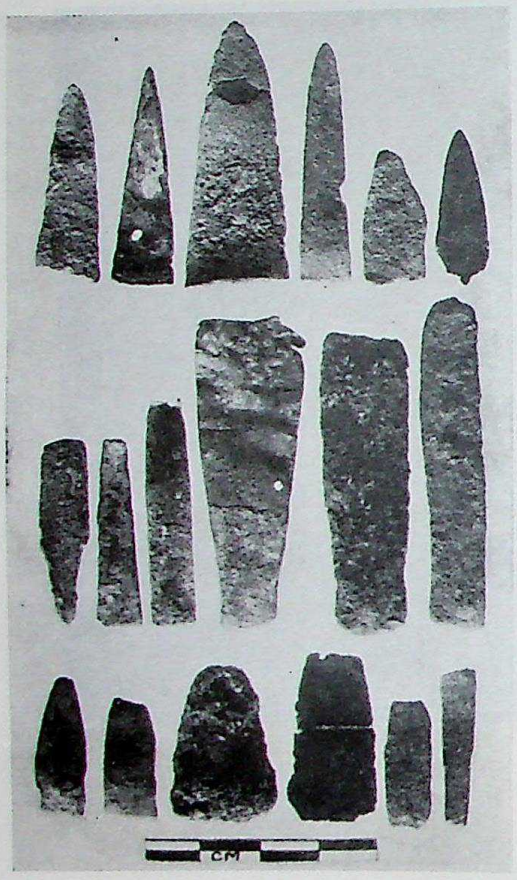
69

70

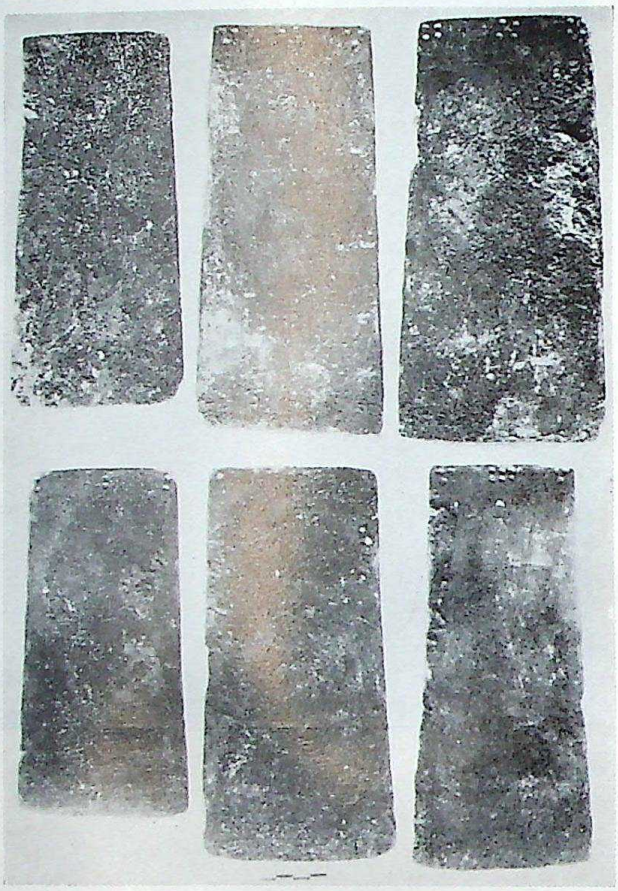
71

72

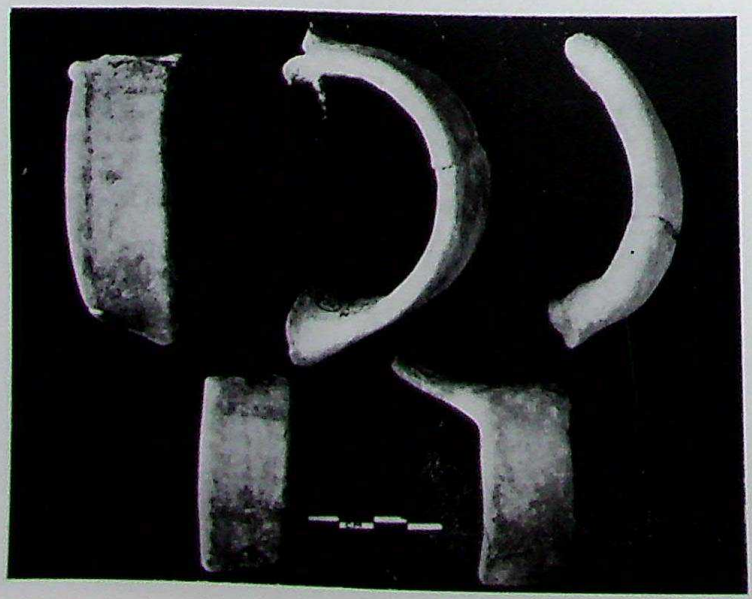
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



73

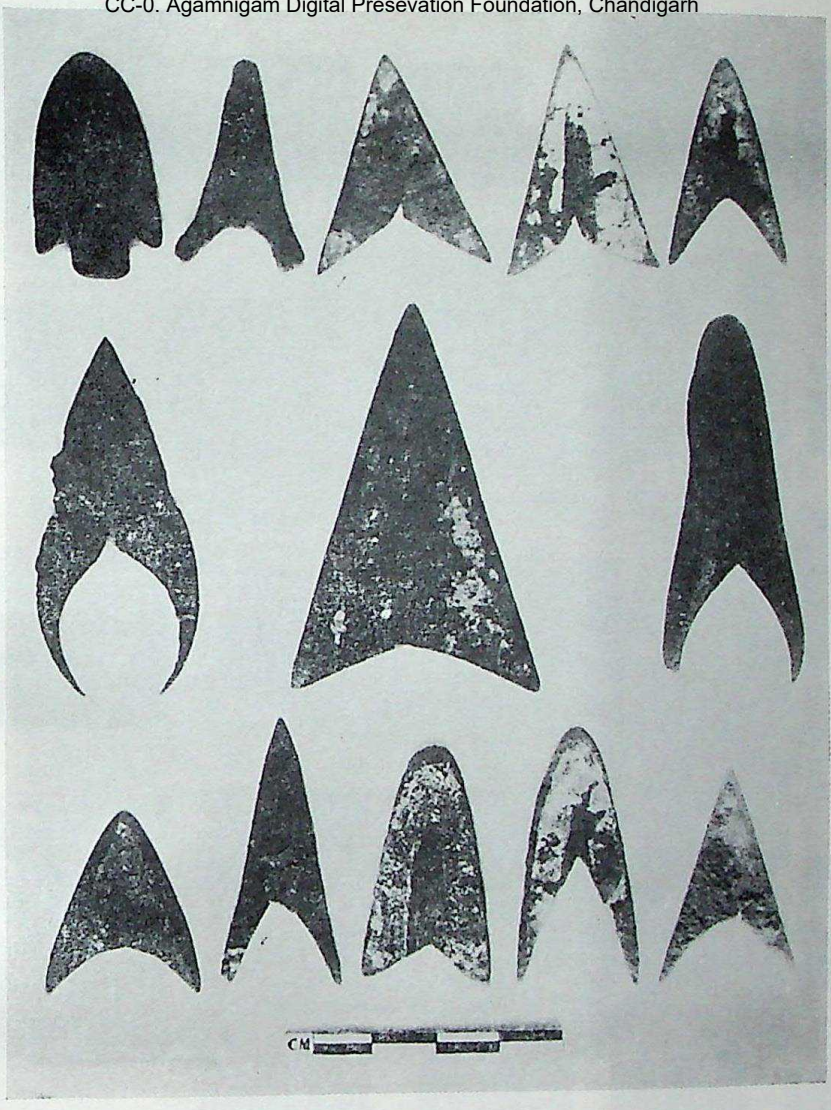


74



75

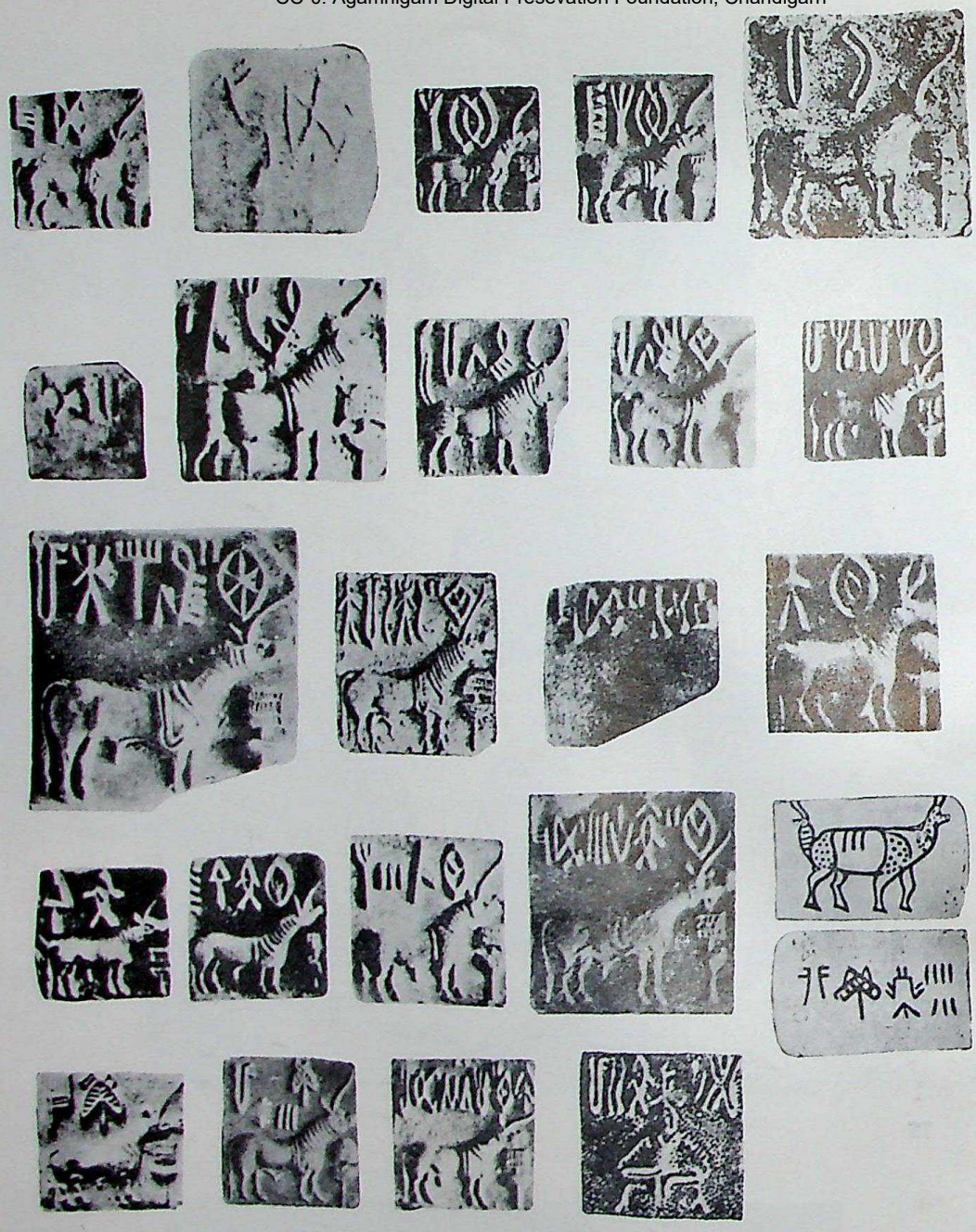
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



76

77

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



78

1 2 3 4 5

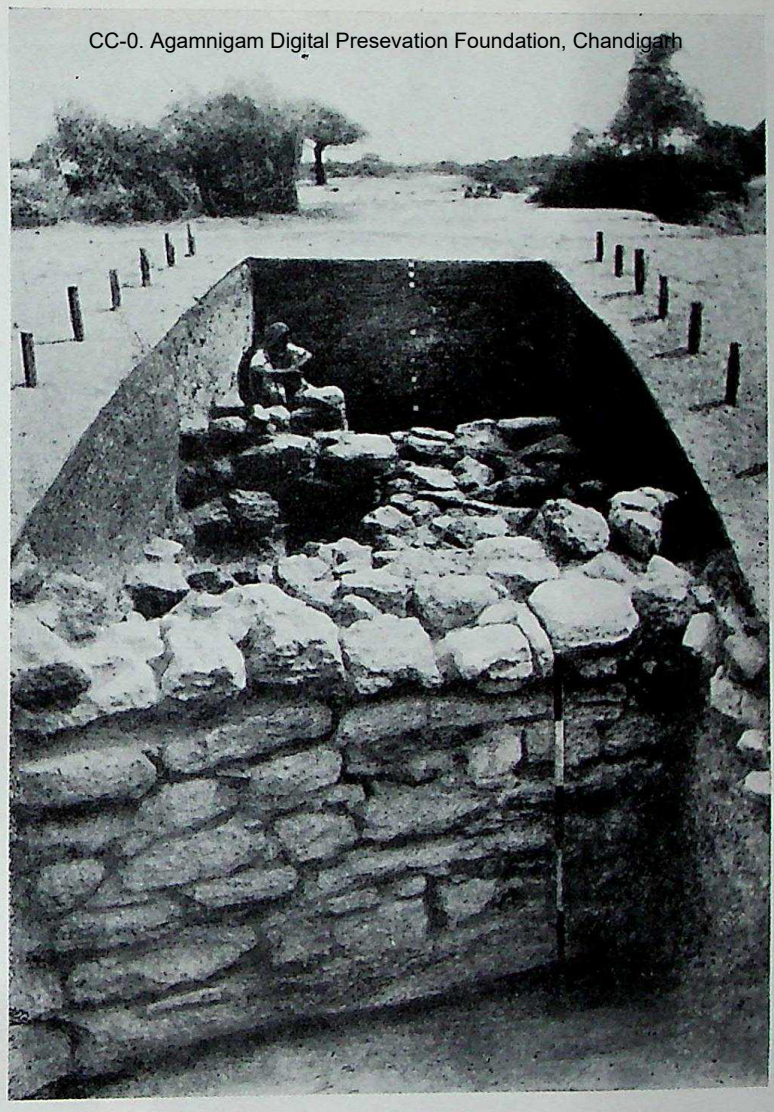
6 7 8 9 10

11 12 13 14

15 16 17 18 19

20 21 22 23

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

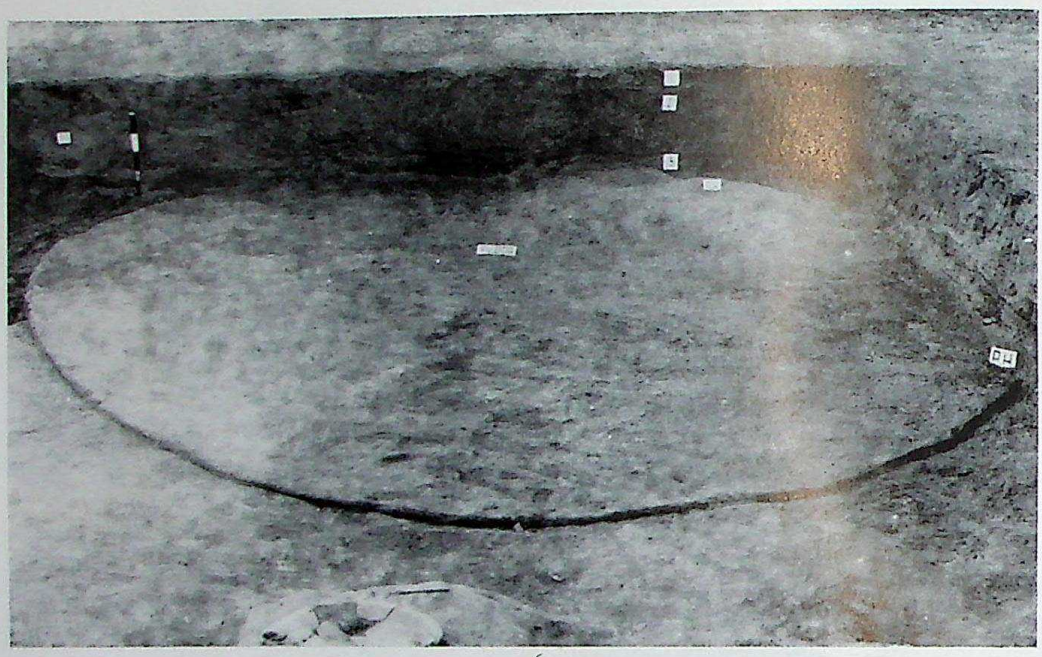


80

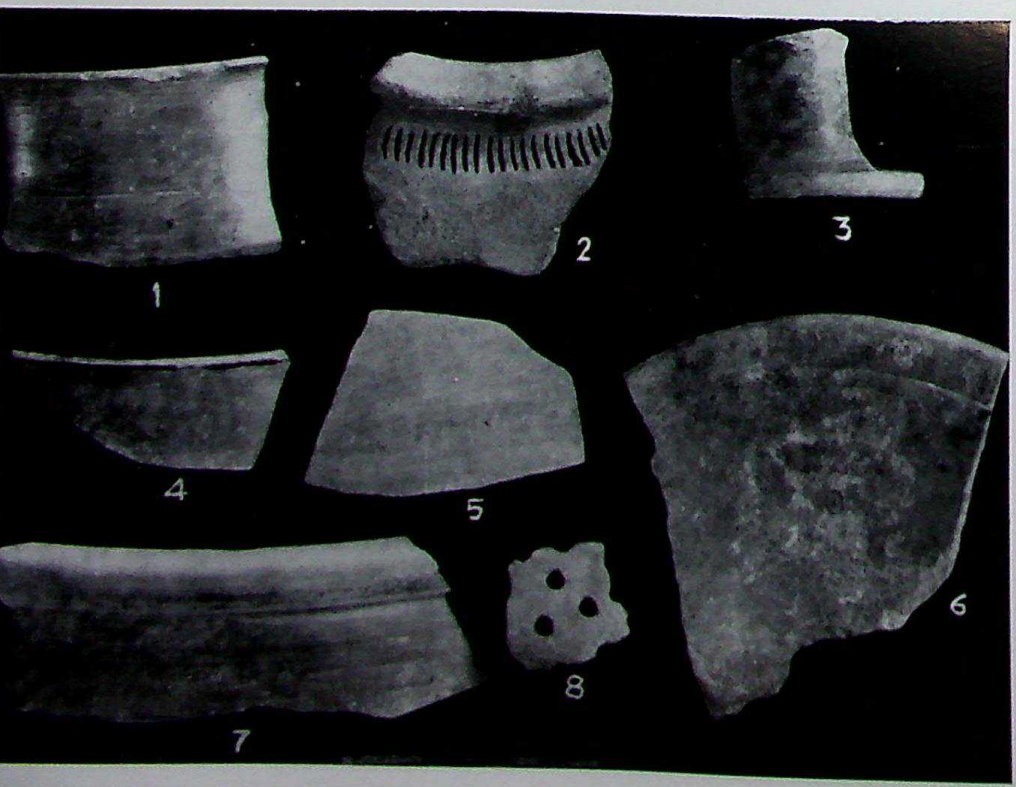
81

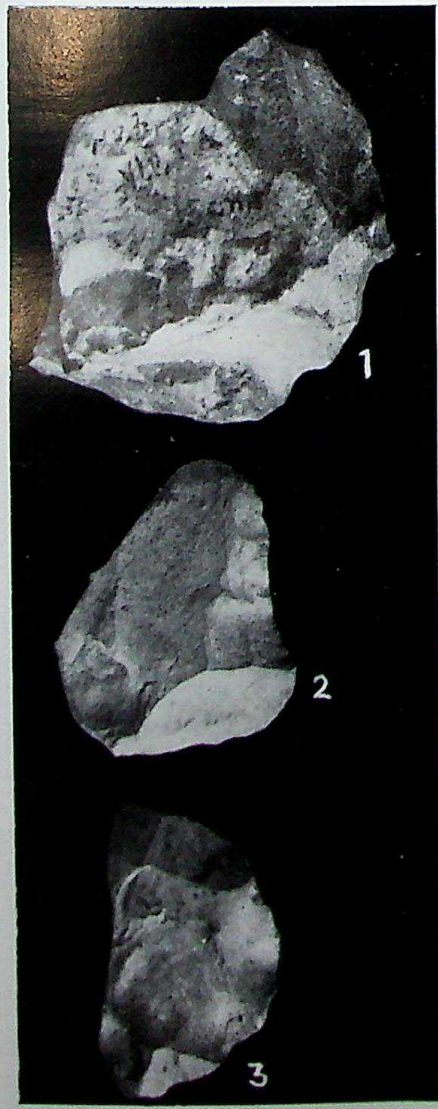
82

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



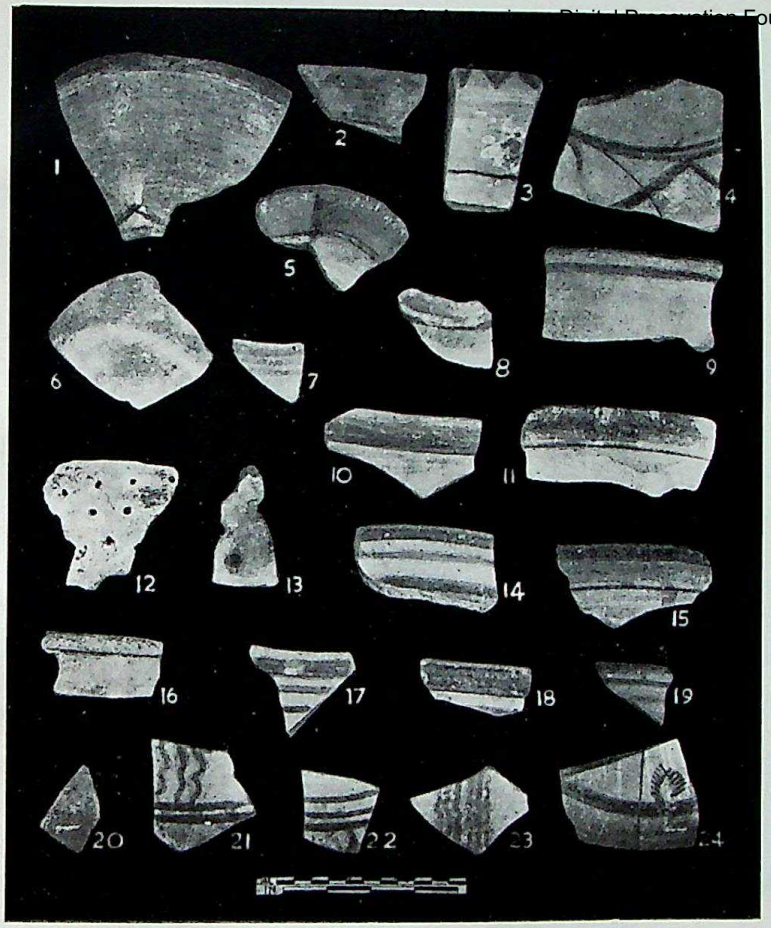
83



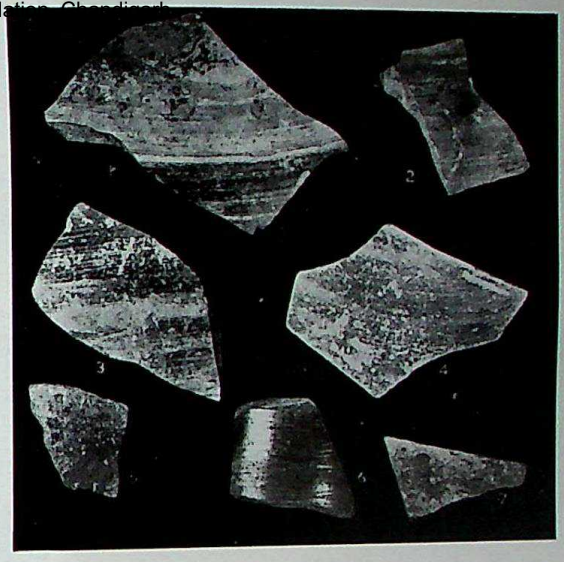


85

Digital Preservation Foundation, Chandigarh



86

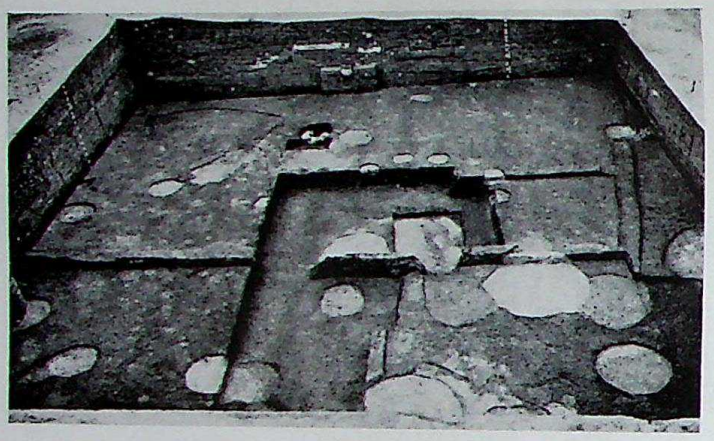


87

88

89

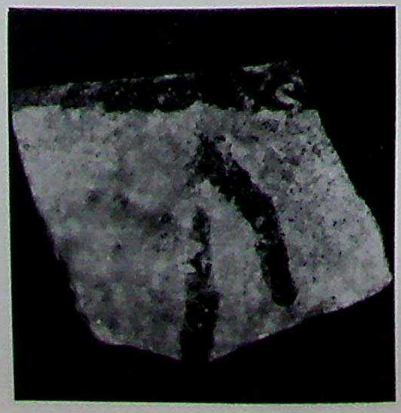
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



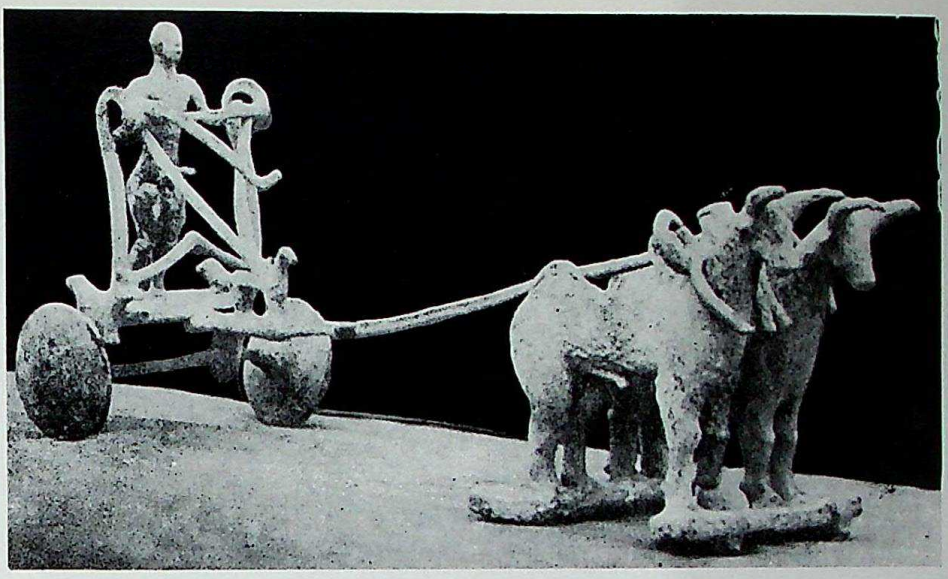
90

91

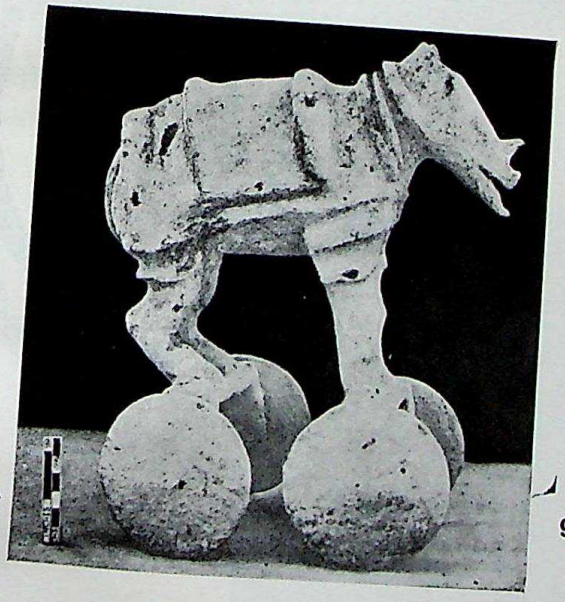
92



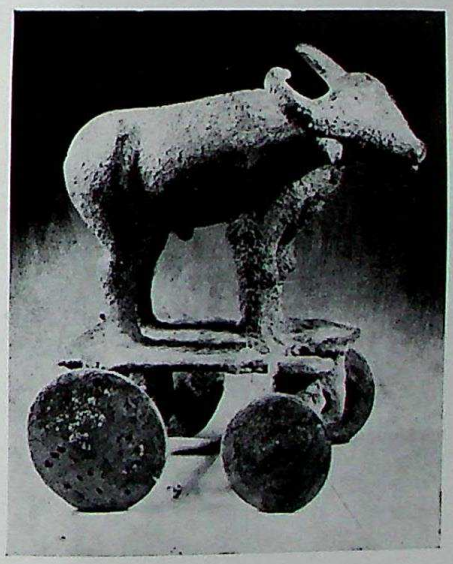
93



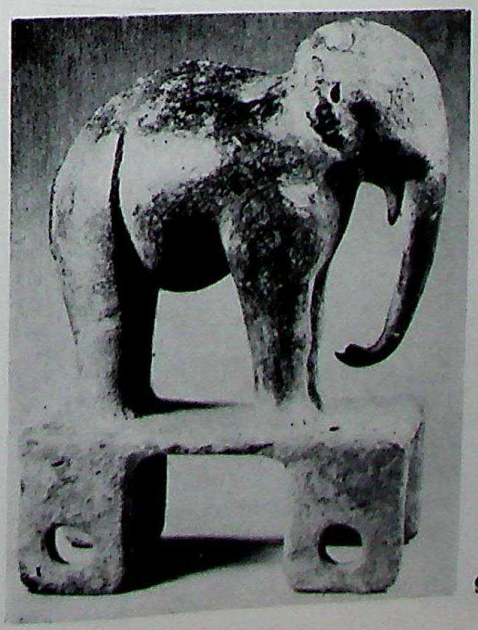
94



95

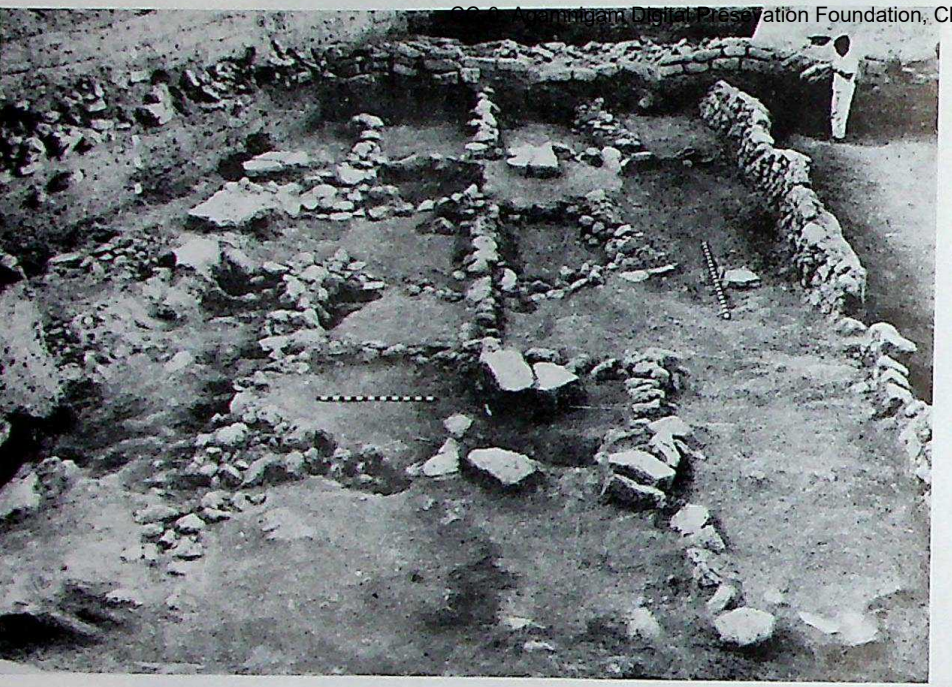


96

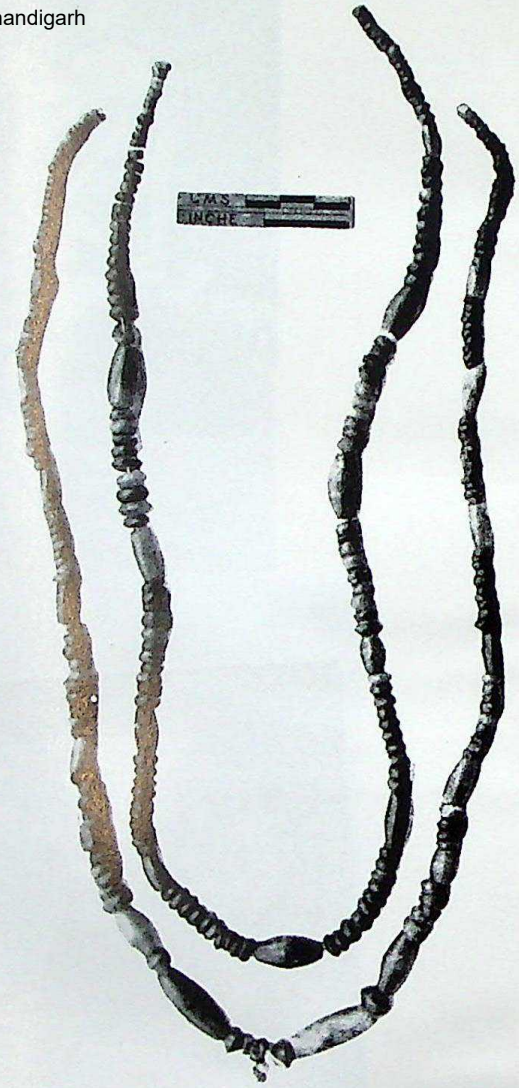


97

CC-0. Panjab Digital Preservation Foundation, Chandigarh



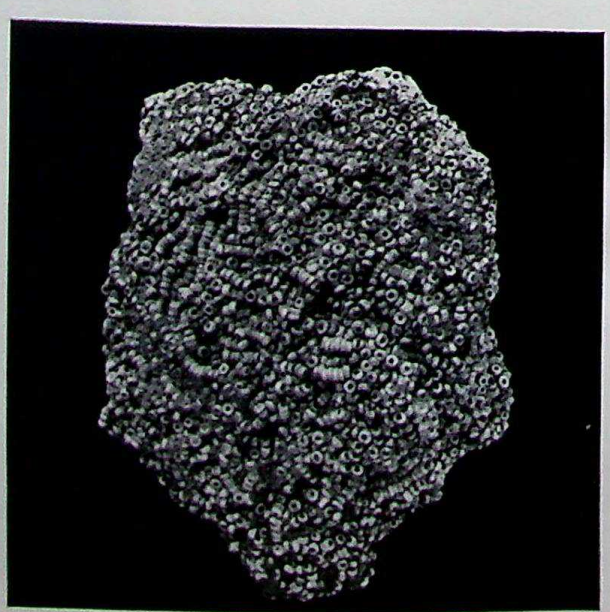
98



99

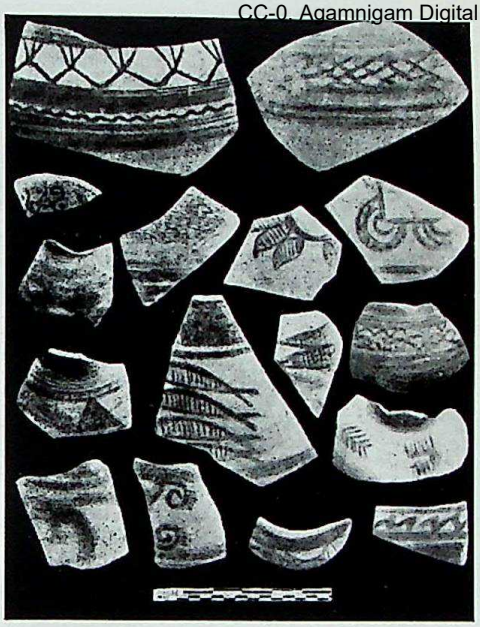
100

101



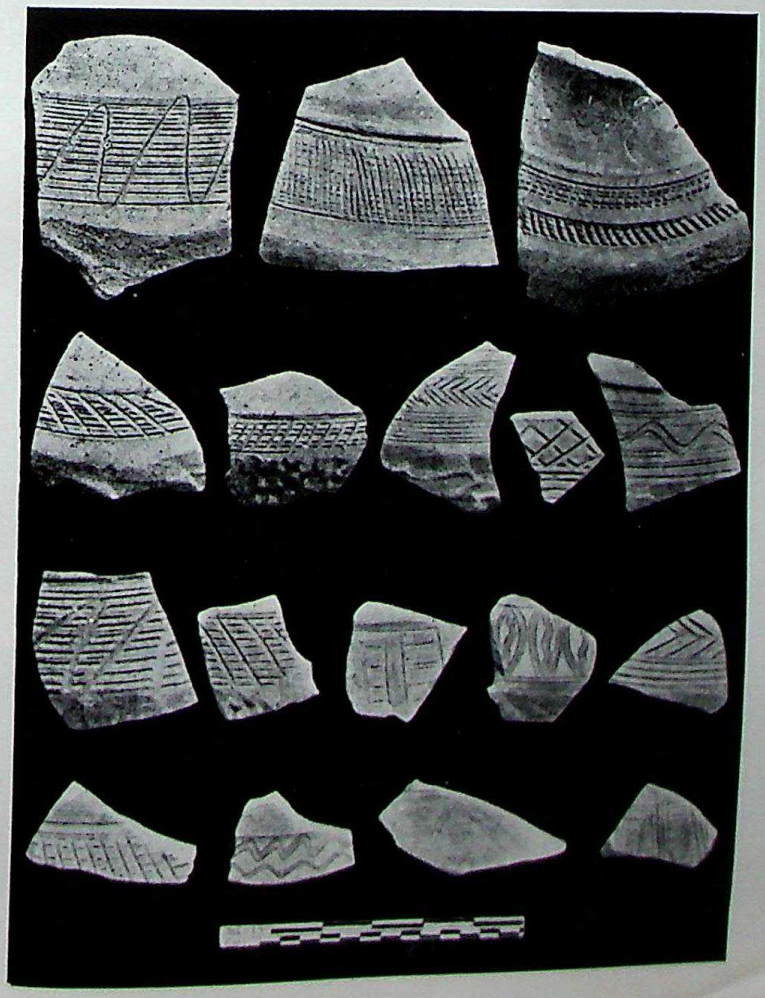
102

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



104

105

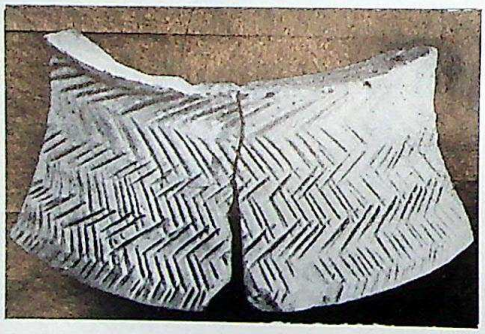


103

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

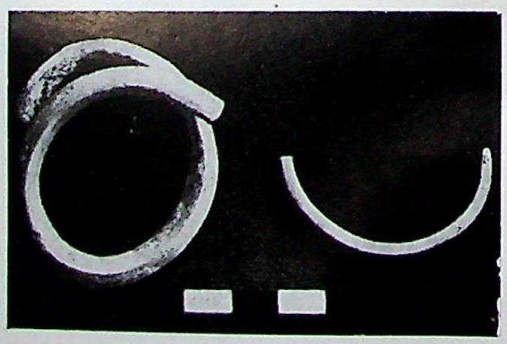
106

108

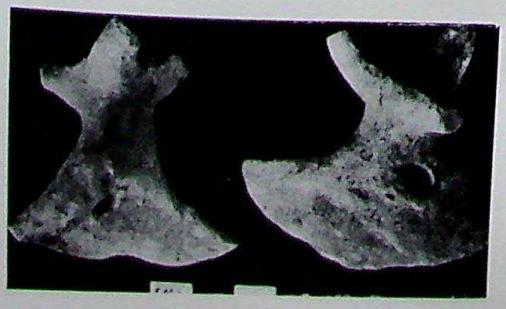


109

107

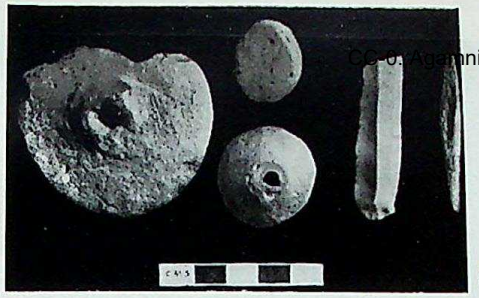


110

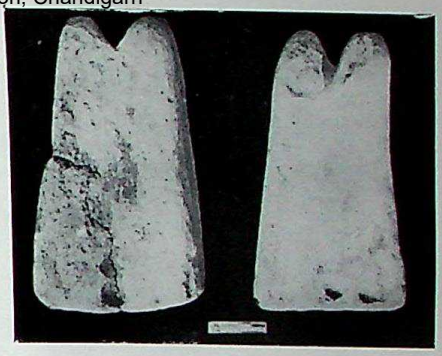


111

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

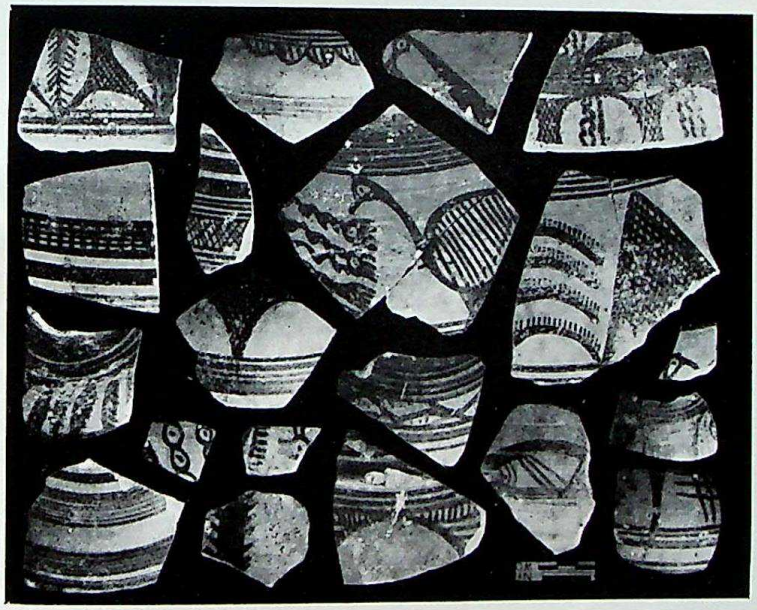


112

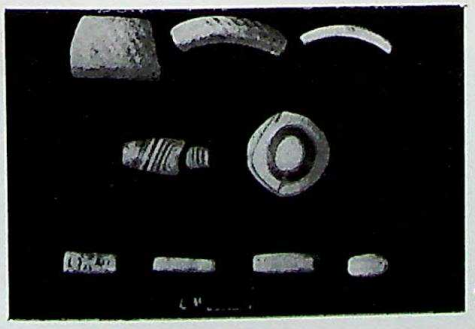


113

116

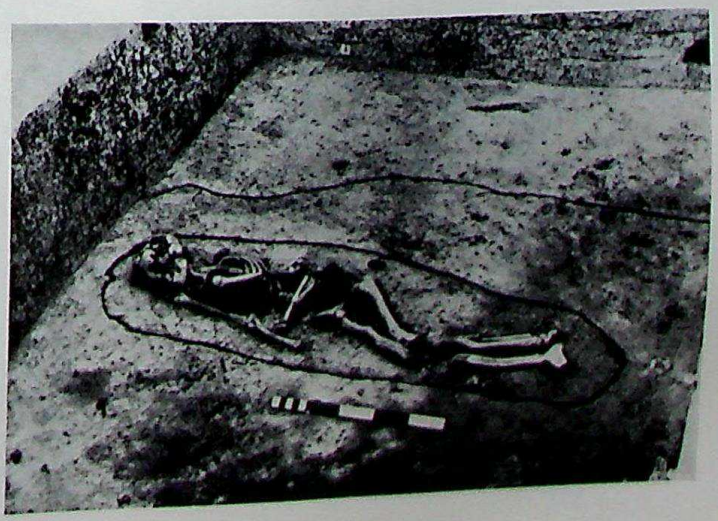


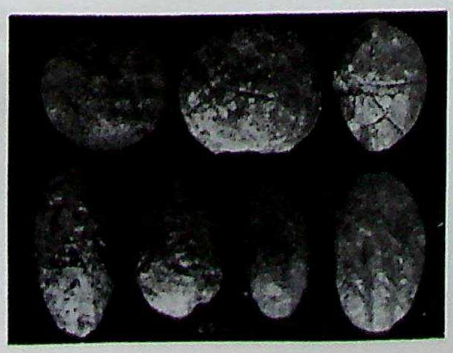
117



114

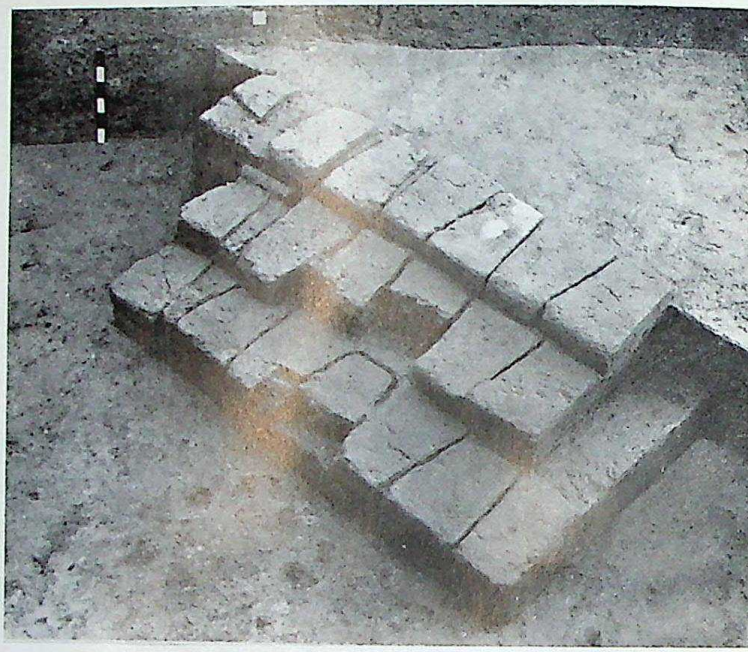
118



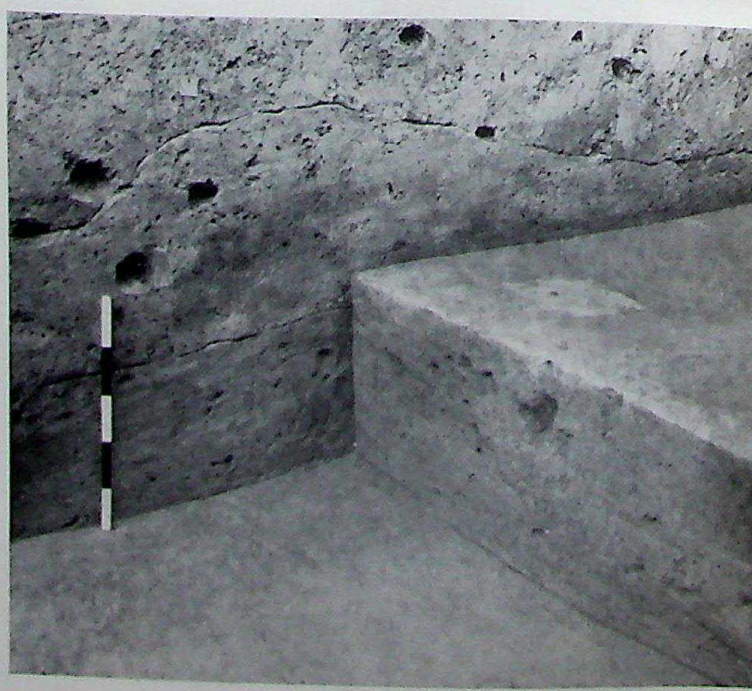


115

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

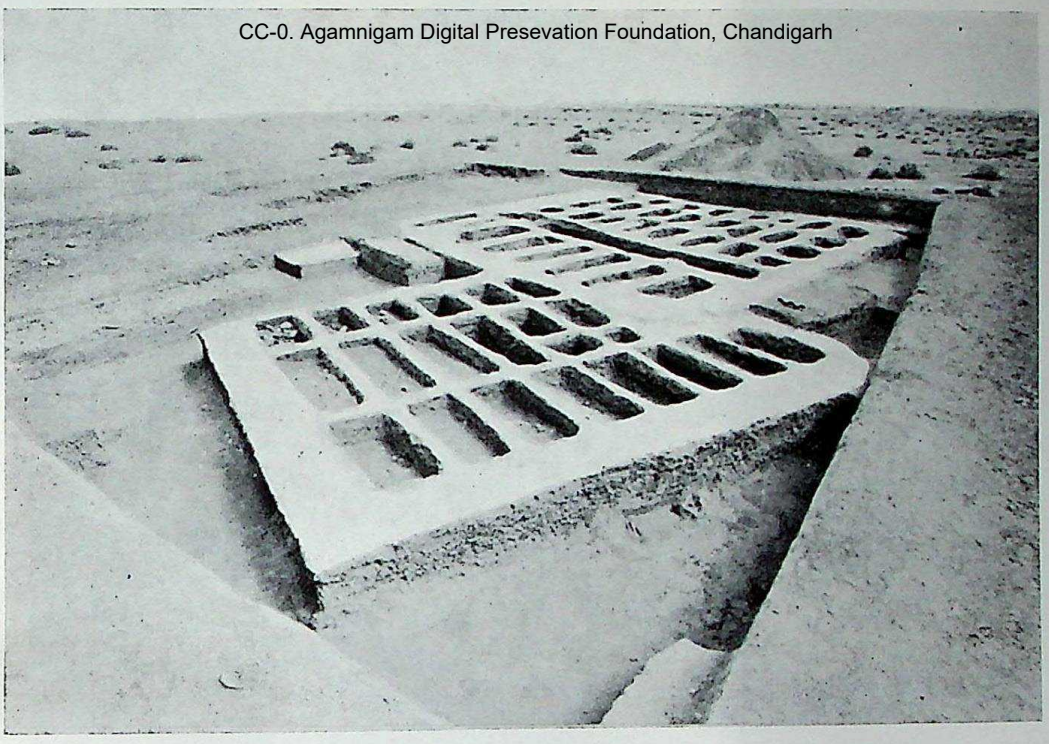


1

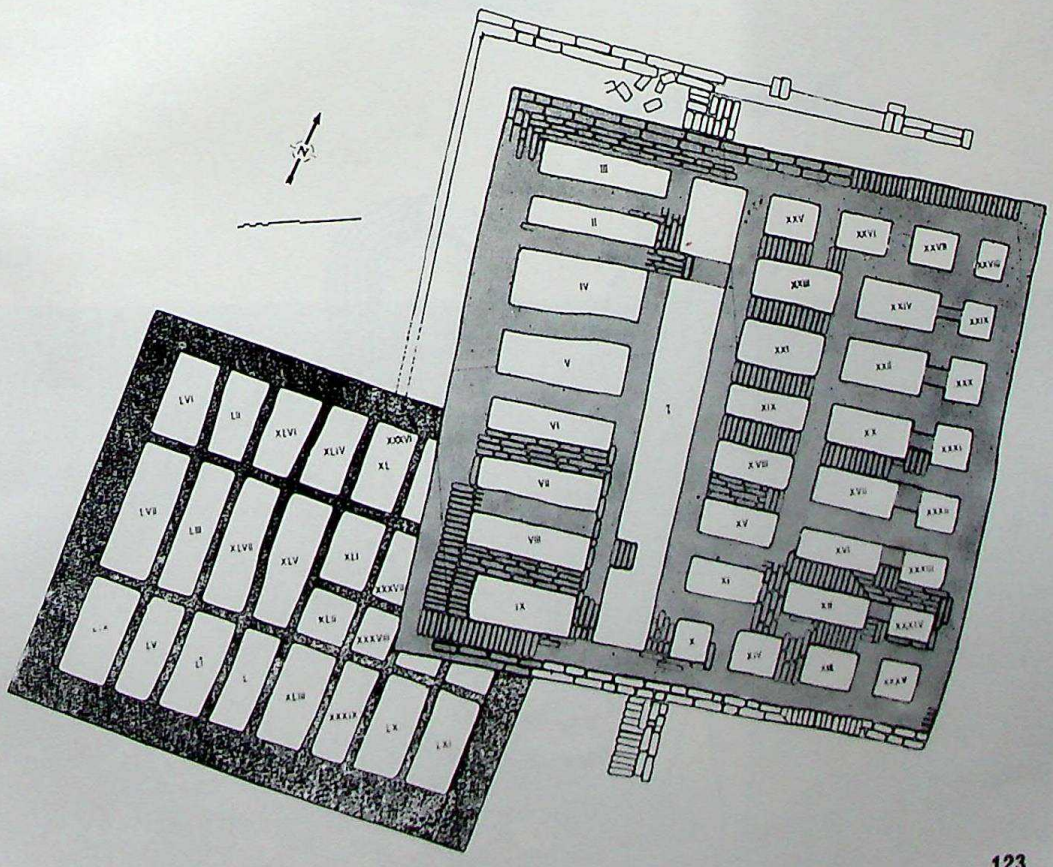


1

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

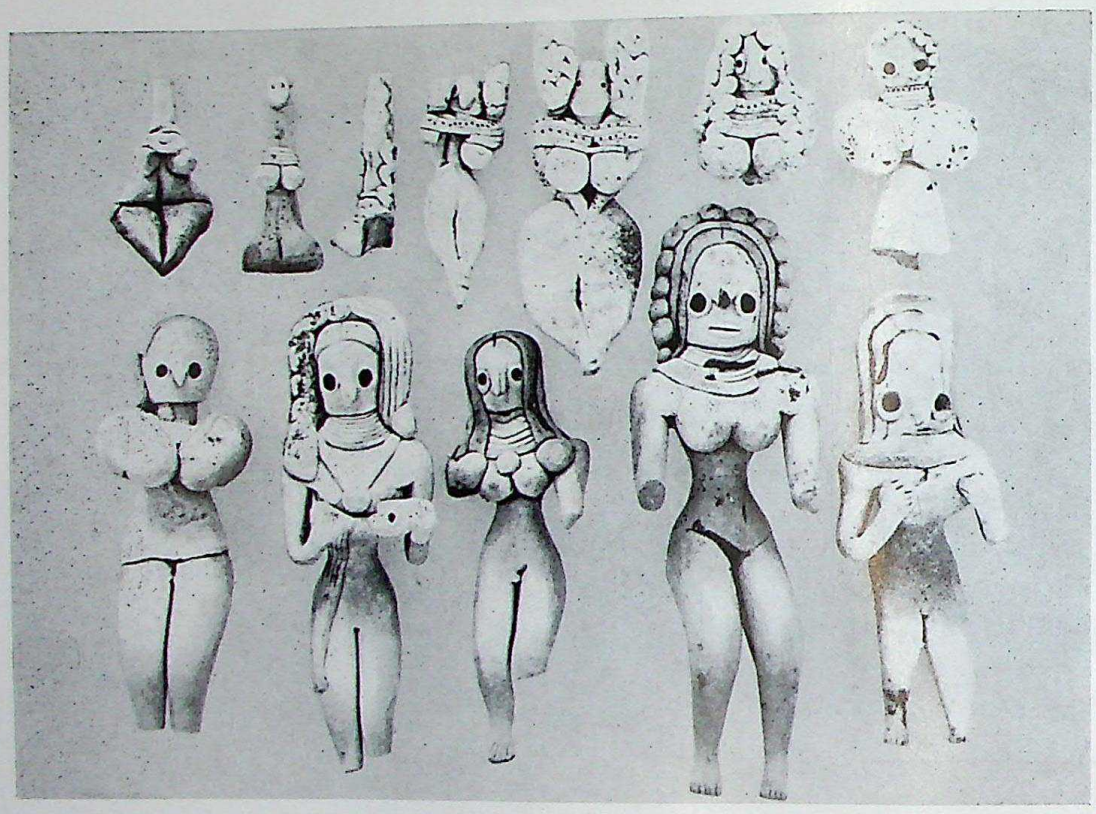


122

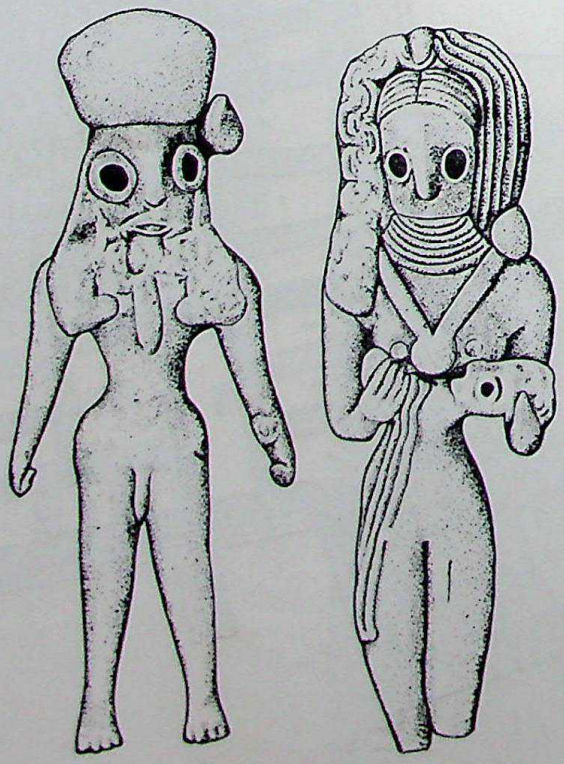


123

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

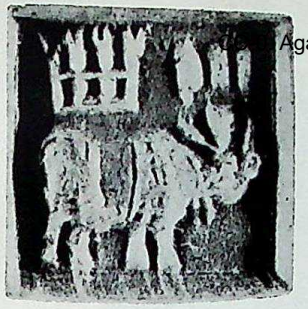


124



125

Agamnigam Digital Preservation Foundation, Chandigarh



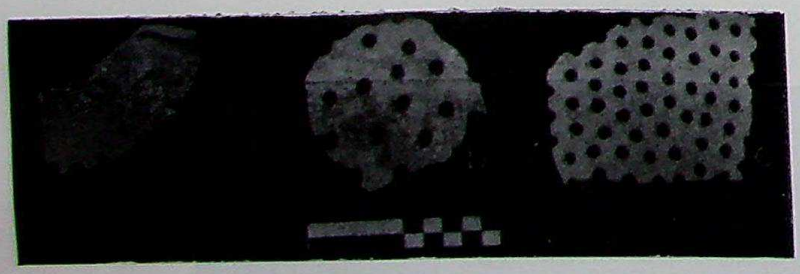
126

127

128

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

129



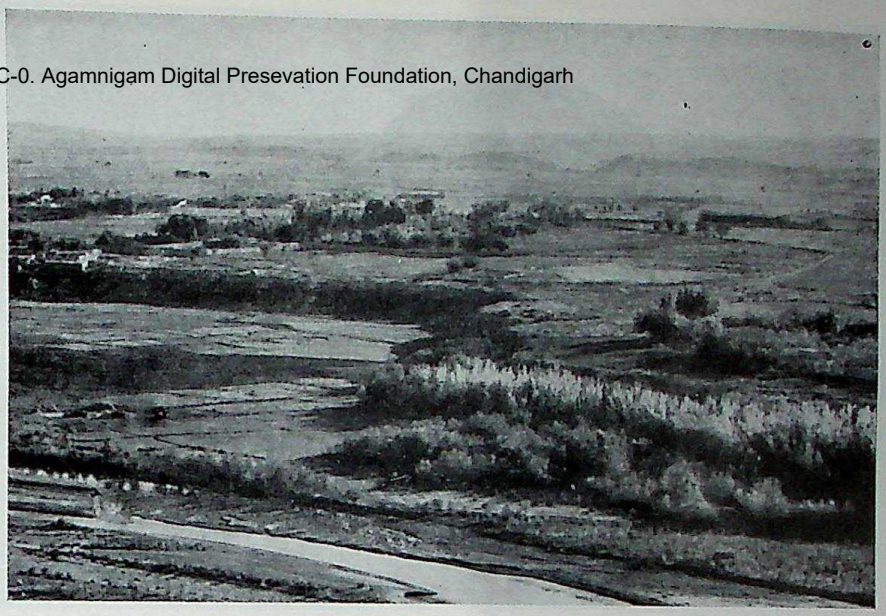
130

a

b

131

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

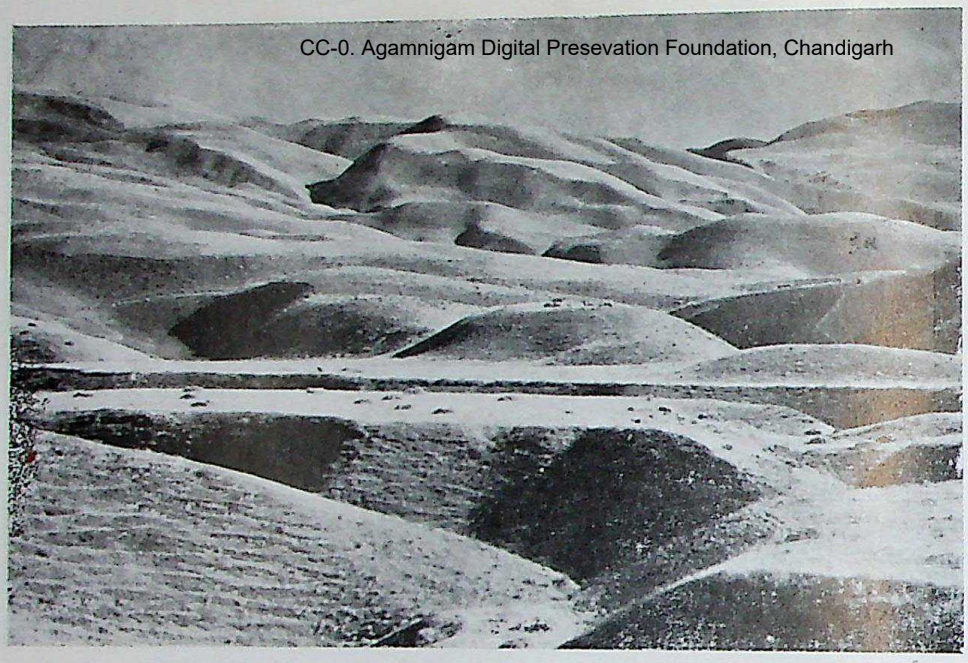


132

133

134

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

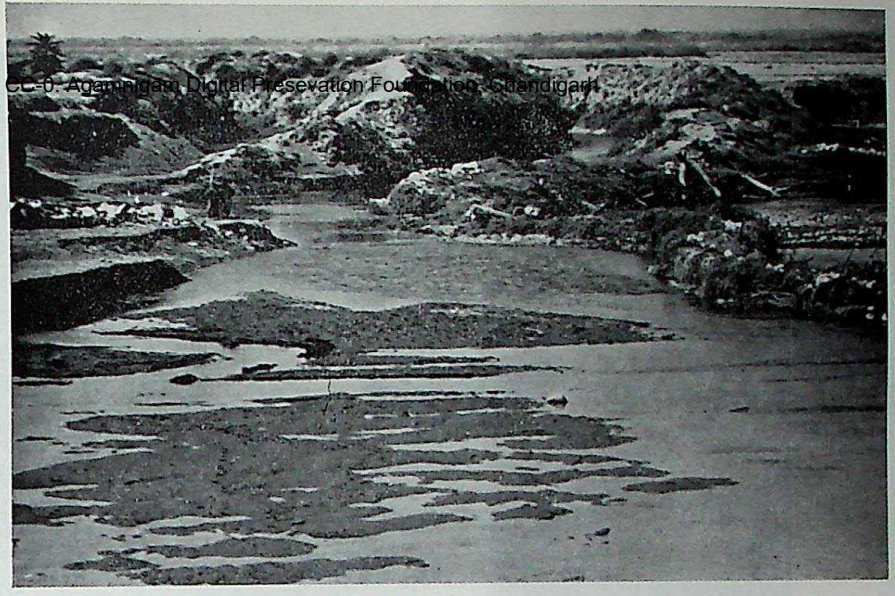


135

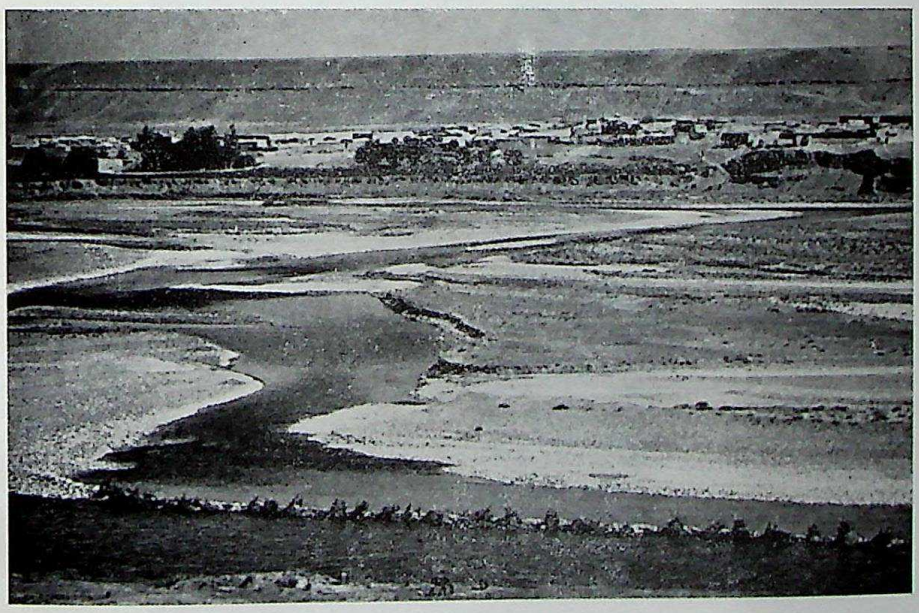
136

137

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh



138



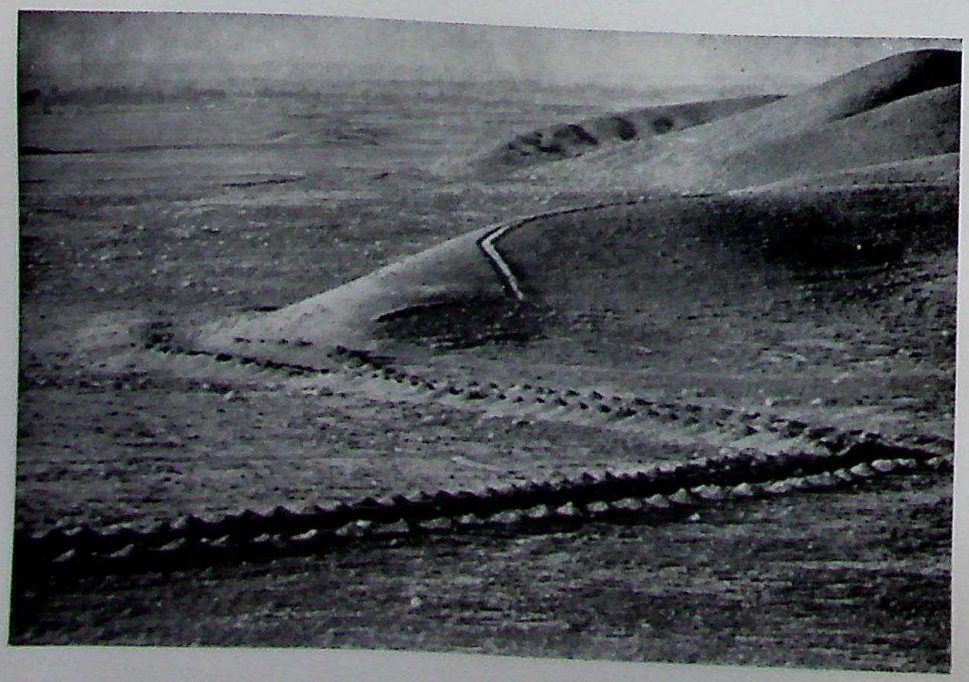
140

139

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

141

142



CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

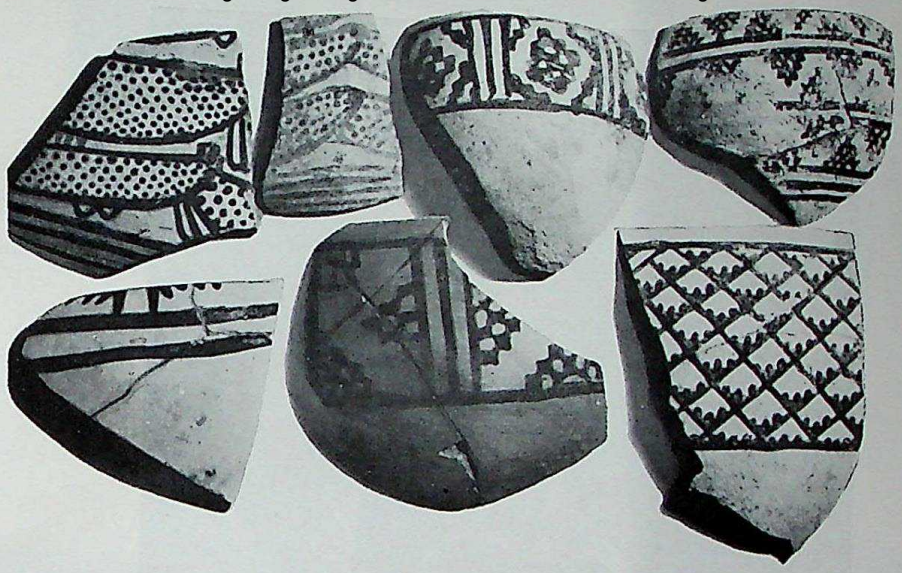
143

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

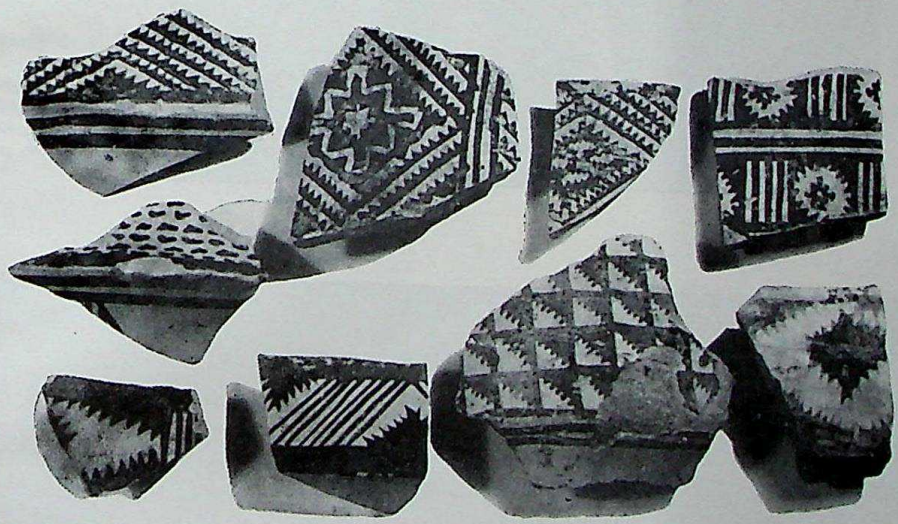
144

145

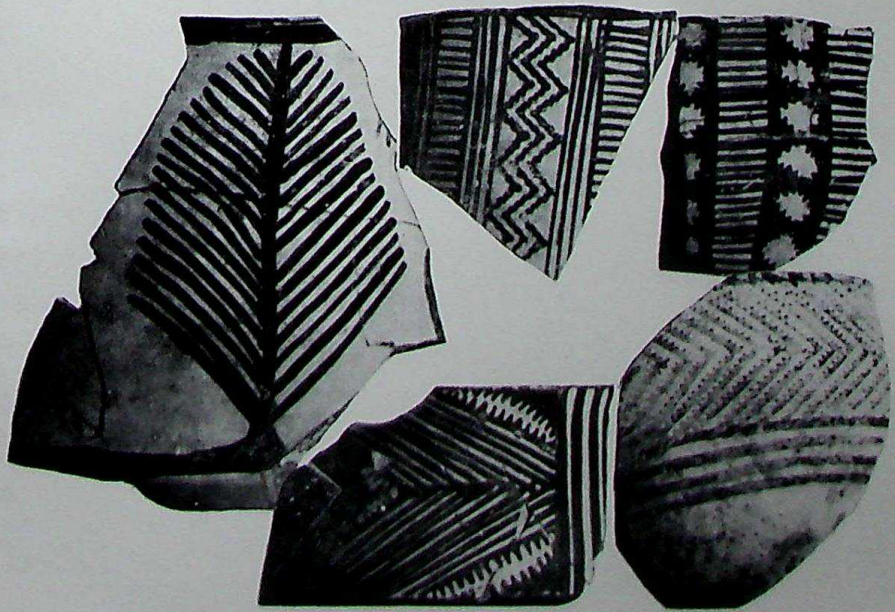
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



146



147



148

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

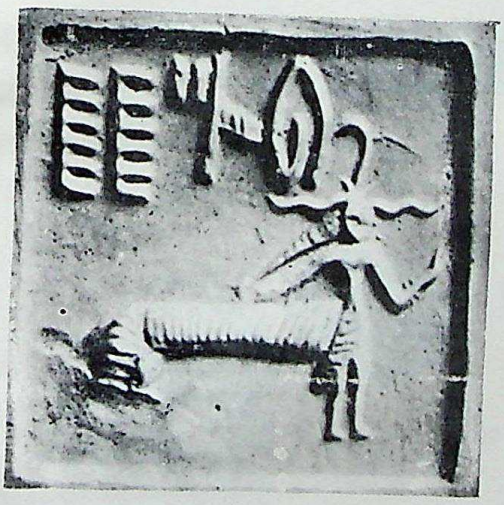
149

150

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

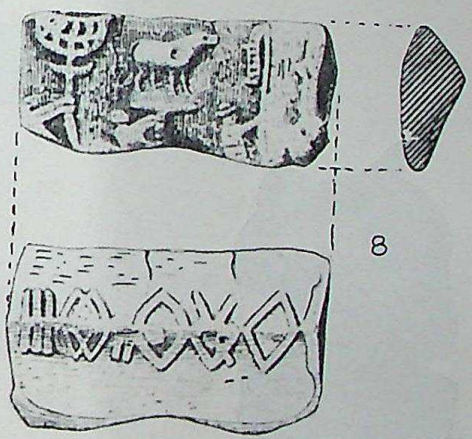
1

151



152

4



8

154

3

153

II a 155

II b 156

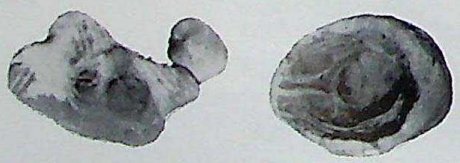
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

II c 157

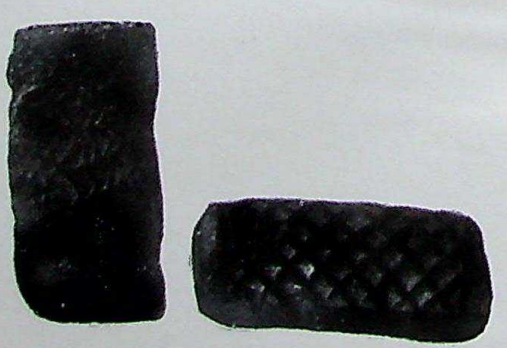
II d 158

III a 159

III b 160



III c 161



III d 162

IV a 163

IV b 164

IV c 165

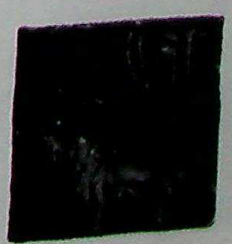
CC-0. Jangamnigam Digital Presevation Foundation, Chandigarh

166

V a 167

V b 168

V c 169



170

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

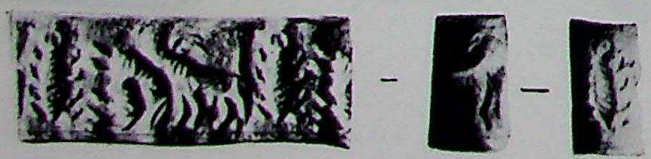
171

5

172

175

174



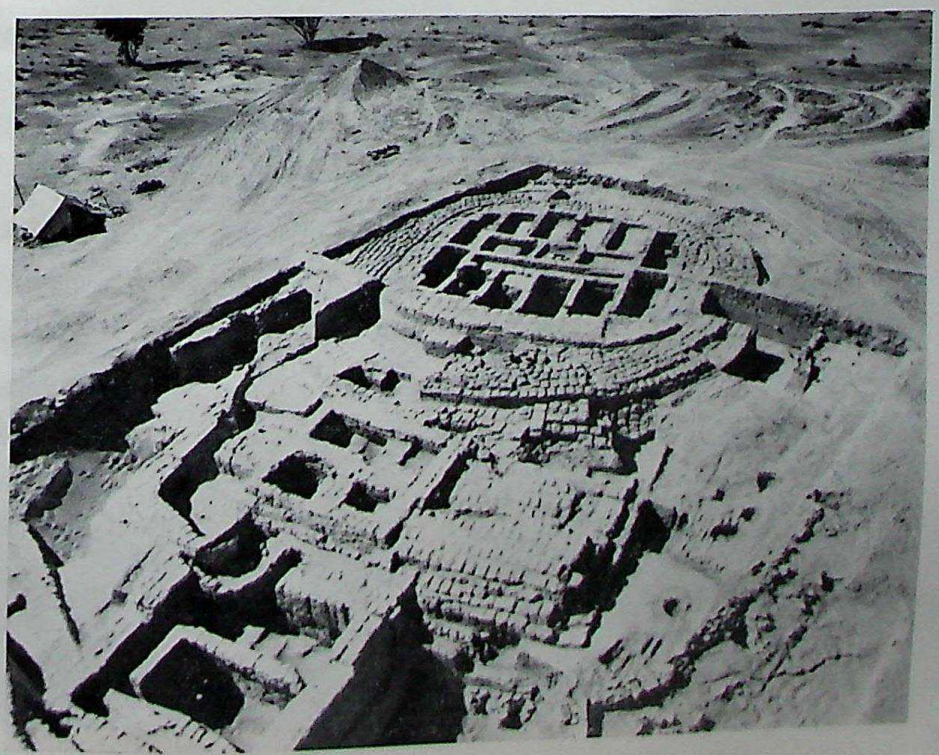
6

7

173

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

176



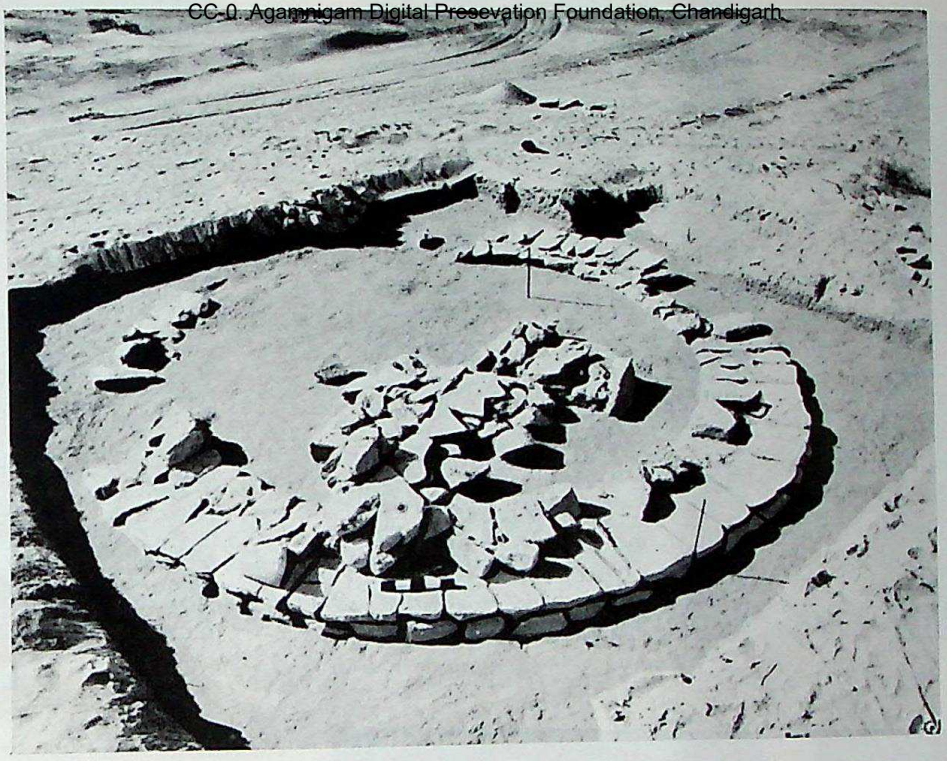
177

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

178

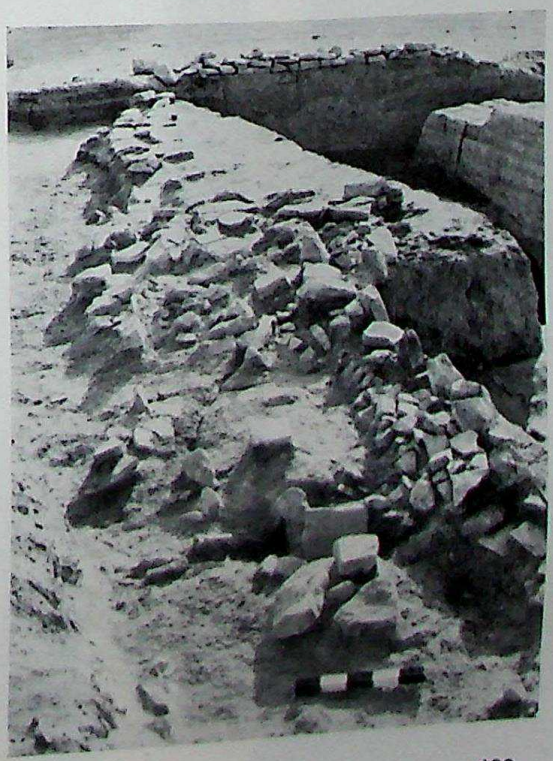
179

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh



180

181



182

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

183

184

185

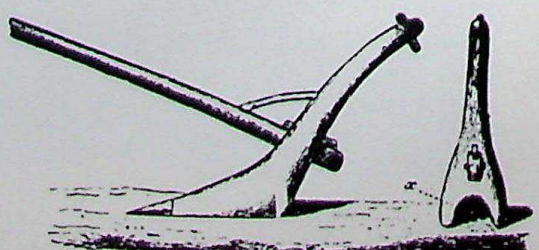
186

187

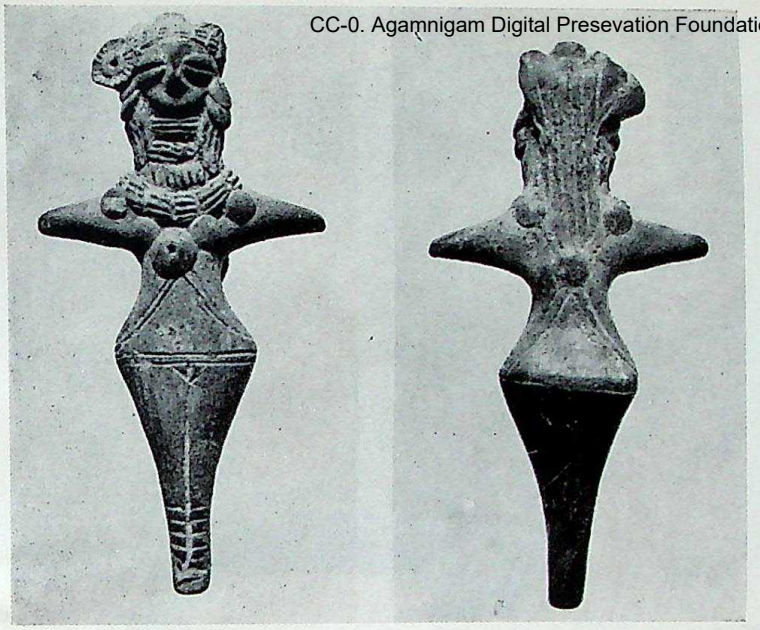
188

189

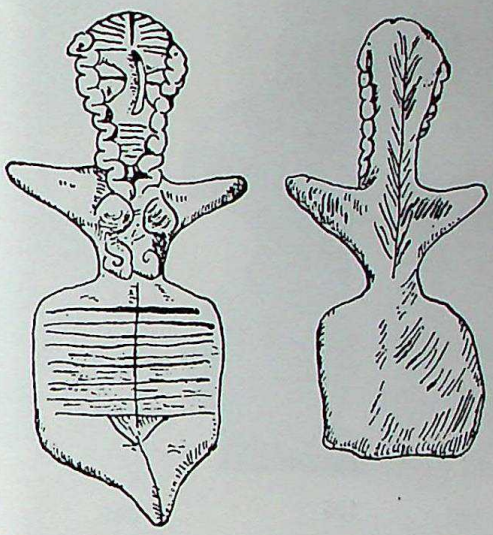
190



CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



191



192

193

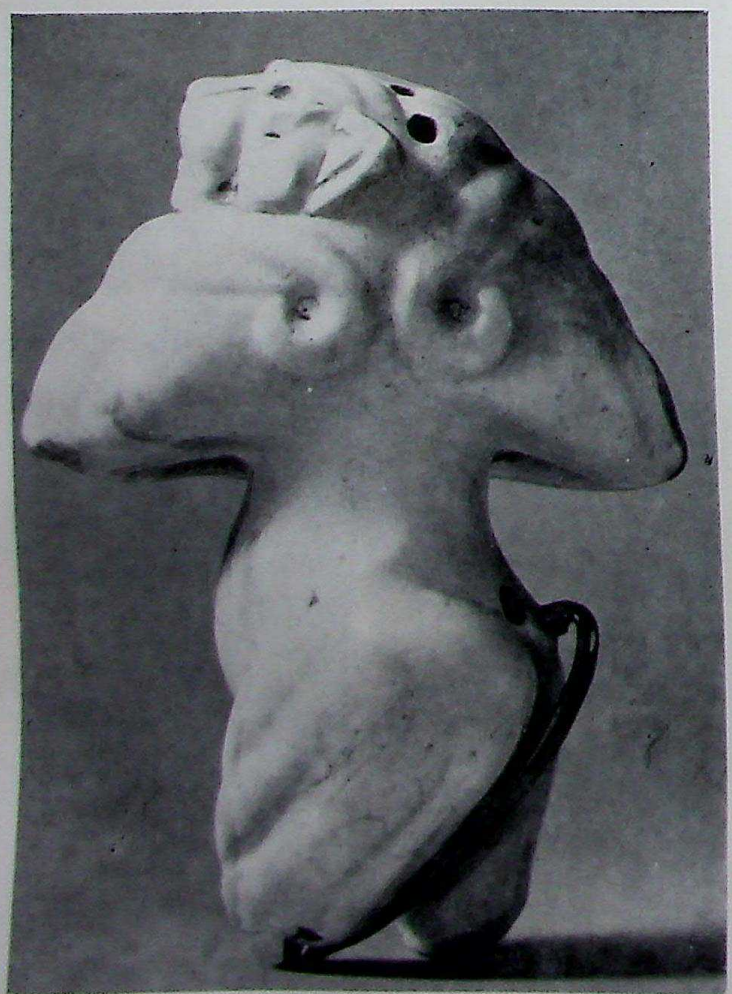
194

195

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

196

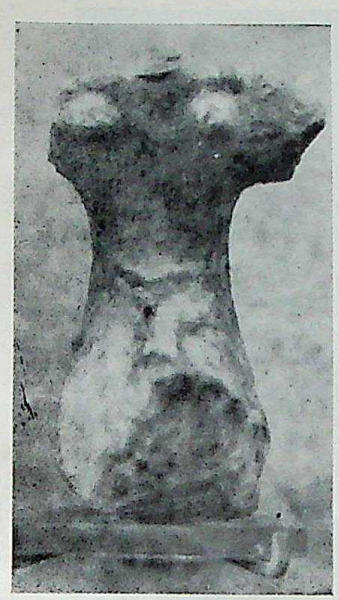
197



198

199

CC-0. Agamdam Digital Presevation Foundation, Chandigarh



200

201

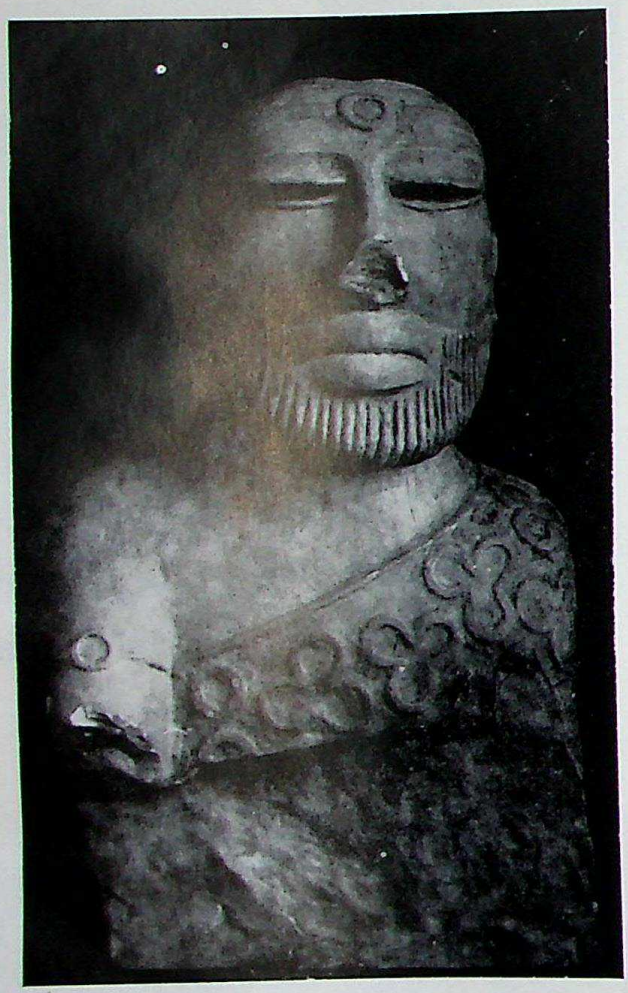
202 A

202 B

203 A

203 B

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



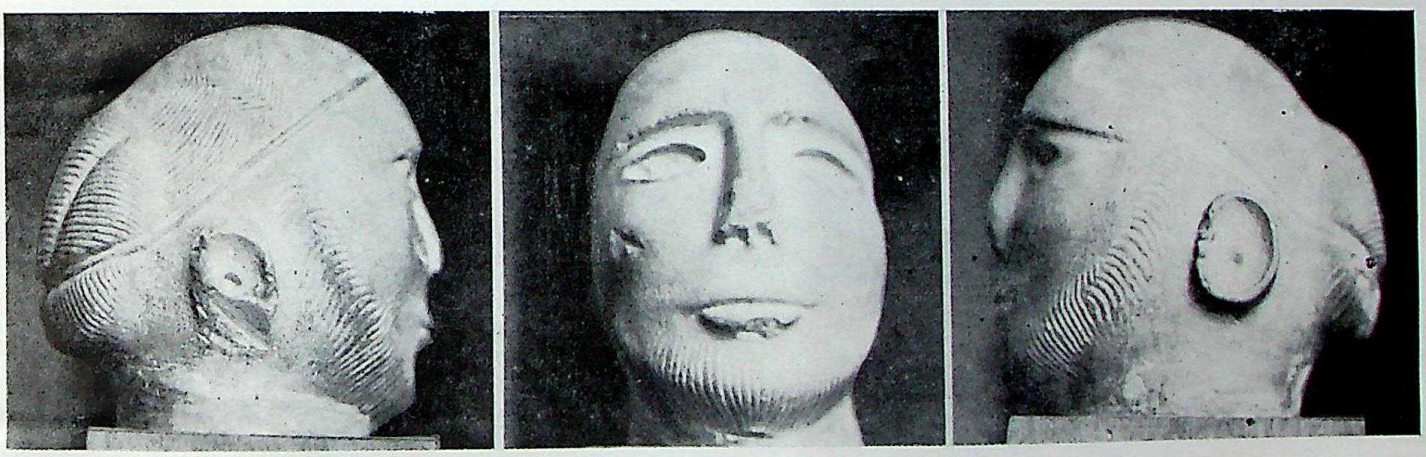
204 A

204 B

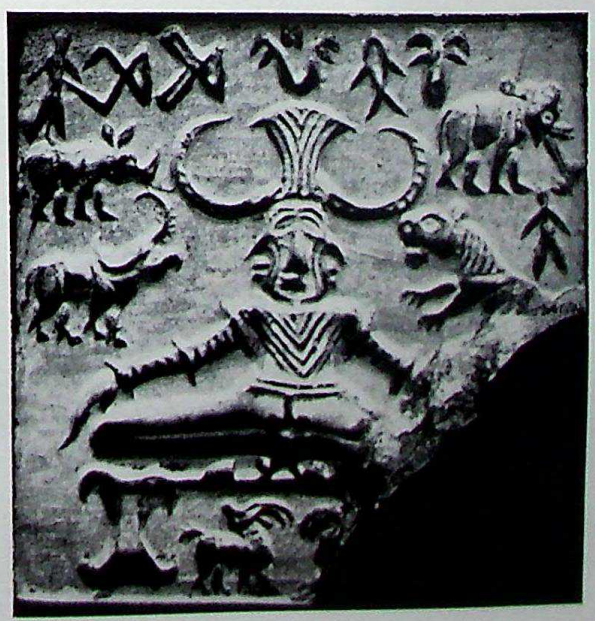
204 C

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

205



206



207

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

208

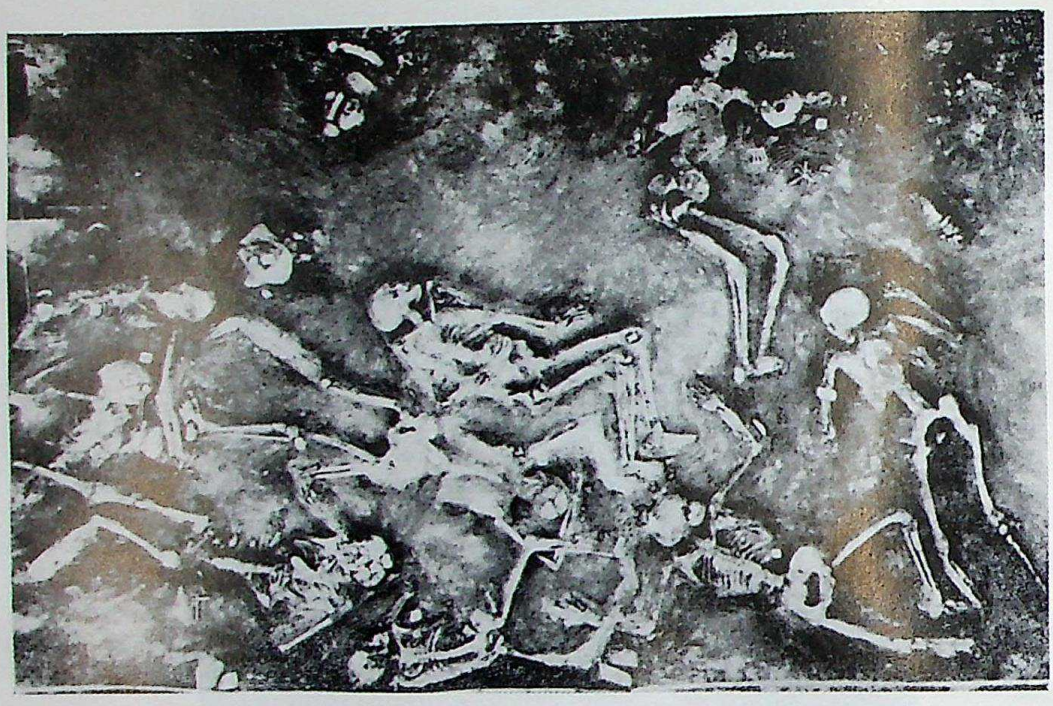
209

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh

210

211

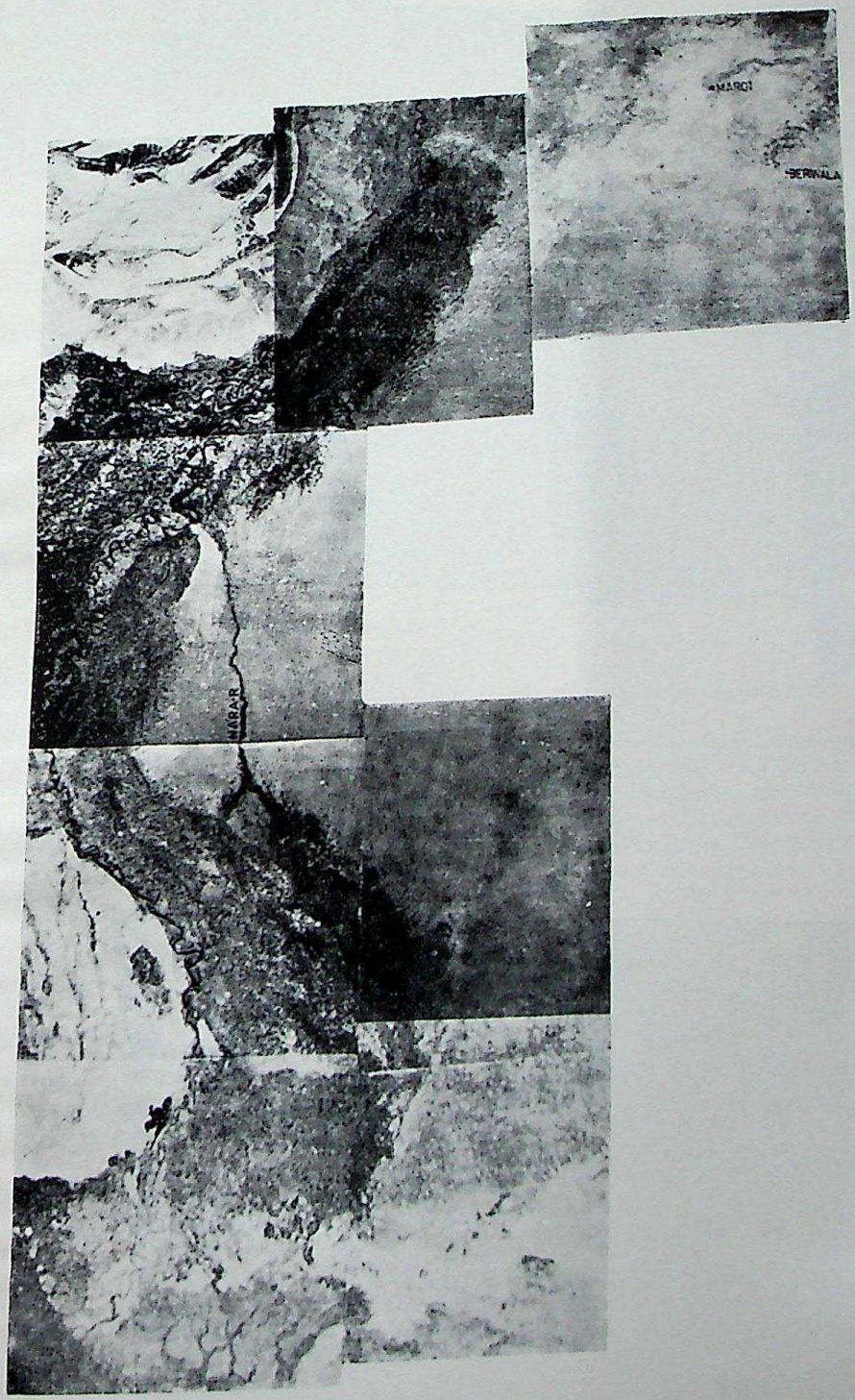
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



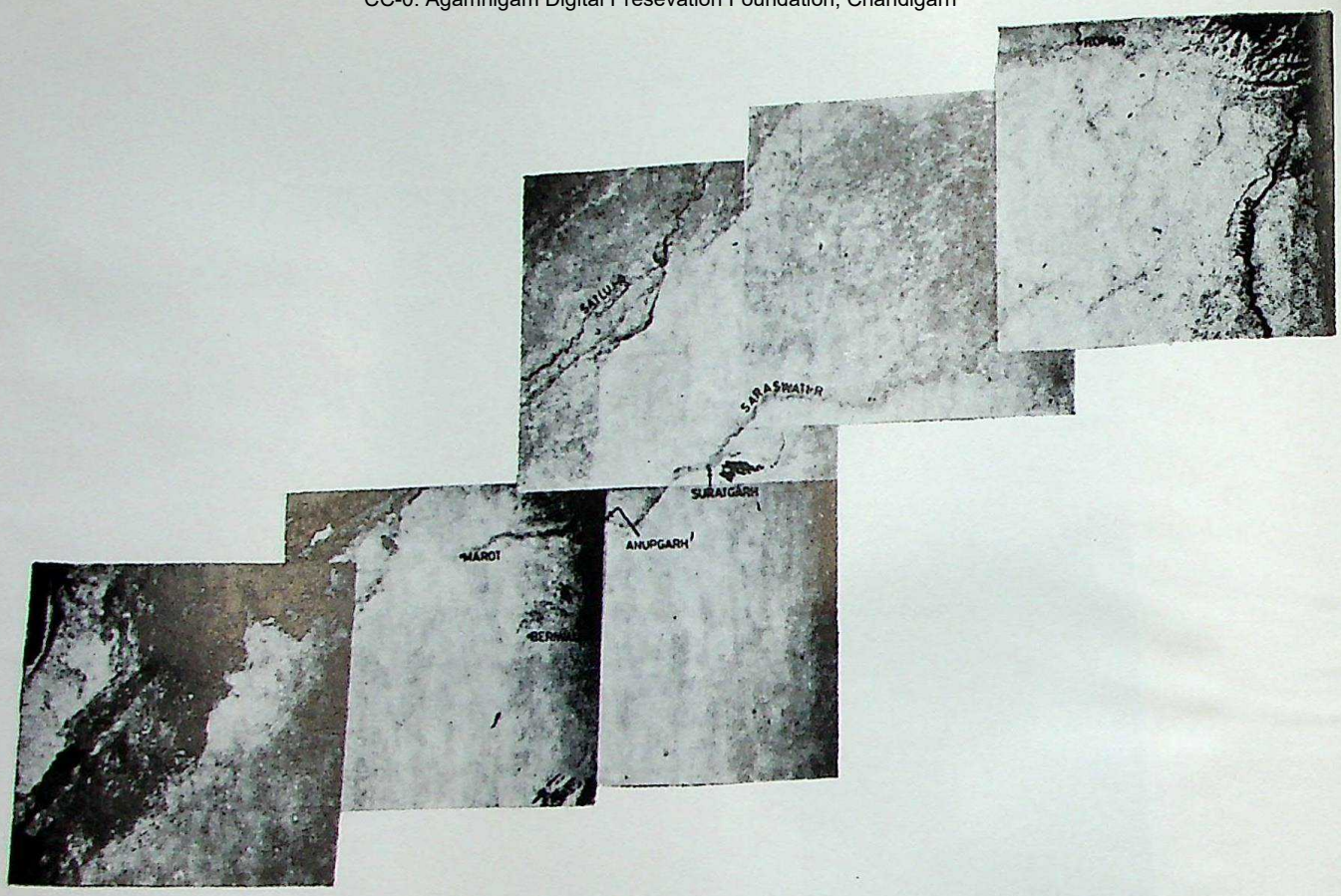
212

213

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



215

216

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

PLATES

Article No. 5: Allchin

1. Rehman Dheri: Observe and Reverse of an ivory seal, Early Indus.
2. Rehman Dheri: Aerial view of the site.
3. Map showing Early Indus sites.
4. Map showing Indus sites.
5. Lewan: Paintings on an Early Indus pot.

Article No. 6: Lal

6. Kalibangan: A row of 'fire altars' on the top of a platform in KLB-1. The altars were subsequently disturbed by drain.
7. Kalibangan: Atop another platform in KLB-1, a brick-lined pit containing bones and antlers, suggestive of animal sacrifice.
8. Kalibangan: A terracotta 'cake' on one of whose sides is incised what may probably be a deity, while on the other is an animal drawn by a person by means of a rope (?). For a sacrifice (?).
9. Mohenjo-daro: Impression of a seal. It seems to depict a deity (extreme right) in front of whom kneels a devotee, behind the latter is an animal presumably brought for sacrifice.
10. Mohenjo-daro: Impression of a seal, depicting what is generally thought to be 'Śiva-Paśupati'.
11. Kalibangan: A 'fire-altar' in one of the rooms of a house in the 'Lower Town' (KLB-2). The room was specially earmarked for putting up the 'fire-altar' which was renewed as the working level rose.
12. Kalibangan: A flight of steps leading to the northern entrance of the southern rhomb of KLB-1.
13. Kalibangan: A view of the southern entrance to the southern rhomb of KLB-1. Being the main entrance, this was much wider than the one on the northern side (Pl.12), had landings and was provided with burnt-brick veneer whose traces were clearly discernible.
14. Kalibangan: Holes at the edge of the eastern salient flanking the southern entrance to KLB-1. It is conjectured that in these holes poles carrying festive banners on their tops were fixed.
15. Kalibangan: Mud-brick-on-edge pavement running along the exterior of the northern wall of the southern rhomb of KLB-1. Remains of bricks-on-edge further beyond indicate that the pavement went up to the entrance to the southern rhomb from this side. It is surmised that on this pavement there moved a ceremonial procession of priests who performed the rituals on the various platforms located within the southern rhomb.
16. Kalibangan: A view of residential houses on the two sides of a lane in the northern rhomb of KLB-1. In this rhomb there were no platforms, nor any congregational 'fire altars'.
17. Kalibangan: Western gate of the fortifications around KLB-2 (Lower Town).
18. Kalibangan: A view of the north-western gateway of the fortifications around KLB-2 (Lower Town). In the foreground is seen the entrance with its western flank, while the human figures stand in the two streets which coalesced near the gateway.
19. Kalibangan: One of the narrower streets in the 'Lower Town'. It may be noted how meticulously any encroachment on the street was avoided all through the life of the township.
20. Kalibangan: A view of the widest street (7.2 m) in the 'Lower Town'. The bullock in the foreground stands at a crossing of streets. At the exterior corner of the house on the right may be seen two holes at successive levels in which wooden fender posts were provided to prevent any damage being caused by vehicular traffic.
21. Kalibangan: Close-up of a wooden fender-post placed at the exterior corner of house at a street crossing to prevent it (the corner) from being damaged by a vehicular traffic.
22. Kalibangan: A house-drain discharging into a brick-edged sullage-jar embedded in a pit adjacently outside the house.
23. Kalibangan: A mud-brick trough and a jar in the court-yard of a house in the 'Lower Town'. On the basis of present day parallels, it would appear that fodder and water for the cattle were placed in the trough and jar, respectively.
24. Kalibangan: A well in the court-yard of a house in the 'Lower Town'.
25. Kalibangan: Storage-jars inside a room of a house in the 'Lower Town'.
26. Kalibangan: Inside a house in the 'Lower Town'. Below the Cross-walls of a later phase may be seen a floor of decorated tiles belonging to an earlier phase.
27. Kalibangan: Criss-cross furrow marks of a pre-Harappan agricultural field. This pattern of ploughing the field has survived through the ages.
28. Kalibangan: Nor far from the ancient site are the modern fields which show the same criss-cross pattern of ploughing as was prevalent during the pre-Harappan times (Pl.27). In the short-distanced burrows are grown the plants of black gram, while in the long-distanced ones are grown those of mustard.
29. Kalibangan: A modern field being ploughed with a camel-drawn plough in U shape manner in a continuous fashion, the alternate U is in reverse order.
30. Kalibangan: View of salient of the fortifications around KLB-1.
31. Kalibangan: A complex (marked KLB-3 on fig. 6.1) containing 'fire altars'.
32. Kalibangan: Roughly circular pits containing funerary pottery.
33. Kalibangan: Graves containing extended burials.

Article No. 7: Kesarwani

34. Harappa, Gateway B: From west fragmentary brick revetment of the main defence wall in background.
35. Harappa, Gateway B: A—wall of Pd.I guard-room. B—wall of Pd.II guard-room. C—drain opening upon the gateway, Pd.II. D—steps, Pd.II. E—drain, Pd.III.
36. Harappa, Gateway: Inner side showing wall of Pd.I reconstruction of Pd.II and blocking of Pd.III.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

37. Kalibangan: Entrance stairway leading across the bipartite fortification wall to the southern half of the 'citadel', Pd.II, looking west.
38. Surkotada: gateway complex.
39A. Mohenjo-daro: A cut by Dales in 1964–65.
39B. Mohenjo-daro: Another cut by Dales in 1964-65.

Article No. 8: Jansen

40. Mohenjo-daro: Moneer site, location of late level structures.
41. Mohenjo-daro: Moneer site, street running north-south (No. 5) from north.
42. Mohenjo-daro: Moneer site, street running north-south (No. 6) from south.
43. Mohenjo-daro: Moneer site, street running north-south (No. 7) from south-east, showing open space in front.
44. Mohenjo-daro: Moneer site, street running east-west (No. 5), from west, showing drain.
45. Mohenjo-daro: Moneer site, entrance passage and parallel rows of compartments, B1 of Zone 3.
46. Mohenjo-daro: Moneer site, vestigal foundations of a flight of steps from the south, B1-3:1 of Zone 3.
47. Mohenjo-daro: Moneer site, free-standing section of the wall retaining the fill. B1 of Zone 3.
48. Mohenjo-daro: Moneer site, an opening in the massive south wall, subsequently blocked up. B1 of Zone 3.
49. Mohenjo-daro: Moneer site 4 structures
50. Mohenjo-daro: Moneer site earthen floors in B1-2.
51. Mohenjo-daro: Moneer site, floor paved with bricks in B1-3:10.

Article No.9: Bisht

52. Banawali: Successive building phases of a Harappan housing-complex in the 'citadel'.
53. Banawali: A typical Harappan drain paved with burnt bricks.
54. Banawali: Successive building phases of the southern house-block of the citadel, near the 'Drain Gate'.
55. Banawali: Sanitary jars placed outside a house in the lower town.
56. Banawali: North-eastern bastion of the citadel wall beside the 'Drain Gate'.
57. Banawali: 'Citadel' wall curving to north-north-west.
58. Banawali: Defence wall of the 'Citadel' with the 'Drain Gate' in the centre. Roads and house-blocks of the 'Citadel' are seen in the foreground. Lower town in the background across the defences.
59. Banawali: Copper objects of the Harappan period.
60. Banawali: Steatite seal from Harappan levels.
61. Banawali: Pre-Harappan painteed (black-on-red with white strokes) pottery.

Article No. 11: Pande

62. Rhinoceros figure (plaster) prepared from a Harappan seal.
63. Elephant figure (plaster) prepared from a Harappan seal.
64. Tiger figure (plaster) prepared from a fragmentary Harappan seal.
65. Bull figure (plaster) prepared from a Harappan seal.
66. Unicorn figure (plaster) prepared from a Harappan seal.

Article No. 15: Meadow

67. Mohenjo-daro: A partial camel skeleton from Wheeler's excavations at Mohenjo-daro in 1950. Bones of the skeleton are not all *in situ*.
68. Mohenjo-daro: Sketch of camel skeleton, (Pl. 67) to show possible original position of skull, as well as the position of some missing or obscured elements or parts or elements. Striped areas are reconstructions.

Article No. 17: Agrawala

69. Ahar: Copper choppers and a celt.
70. Kurada (or Khurdi): Copper celts, choppers and rings.
71. Ganeshwar: Red pottery with graffiti.
72. Ganeshwar: Reserved Slip Ware type red ware with paintings in wavy lines, seen in black.
73. Ganeshwar: Copper implements.
74. Ganeshwar: Copper celts with indentations.
75. Ganeshwar: Strap handles of Ochre Coloured Pottery. They resemble the handles from Saipai an OCP site in U.P.
76. Ganeshwar: Copper arrow-heads.
77. Kurada (or Khurdi): Copper bowls

Article No. 22: Rao

78. Harappan inscribed seals, numbering 1 to 23, counting from left to right, starting form the top line, as is done in a passage wirtten in Roman script.
79. Mohenjo-daro: The so-called 'Pasupati' seal.

Article No. 25: Sounder Rajan

80. Desalpur: A stone wall in excavated trench.
81A. Desalpur: An inscribed steatite seal.
81B. Desalpur: A sealing.
82. Desalpur: Terracotta objects.

Article No. 26: Mehta

83. Nesadi: Circular Kuba or *danga* with rammed floor. A broken dish lies outside it.
84. Nesadi: Ceramics—1. black-and-red ware, 4. Lustrous Red Ware, 5. Buff ware. Rest, red ware.
85. Nesadi: Scrapers made on basalt flakes.

Article No. 28: Sali

86. Daimabad: Painted black-on-red ware, Late Harappan (or Phase II).
87. Daimabad: Ribbed birchome and other fine pottery, Late Harappan.
88. Daimabad: Mud-brick debris by the side of a mud-wall, Late Harappan.
89. Daimabad: Grave lined with mud-bricks, Late Harappan.
90. Daimabad: Extant mud walls, floors, storage pits, etc., Late Harappan.
91. Daimabad: Incribed terracotta seal, Late Harappan.
92. Daimabad: Inscribed Pot-sherd, Late Harappan.
93. Daimabad: Pot-sherd bearing a painted Harappan character.
94. Daimabad: Bronze chariot.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

95. Daimabad: Bronze rhinoceros.
96. Daimabad: Bronze bull.
97. Daimabad: Bronze elephant.

Article No. 29: Dhavalikar

98. Prabhas Patan: Stone structure.
99. Kayatha: Necklaces of beads of semi-precious stones.
100. Kayatha: Copper axes.
101. Prabhas Patan: Stone seal with two stags engraved deeply.
102. Kayatha: Micro beads of steatite.

Article No. 30: Dikshit

103. Bara: Incised Pottery.
104. Bara: Painted pottery.
105. Hulas: Terracotta sealing.
106. Hulas: Indeterminate terracotta object.
107. Alamgirpur: Painted pottery, Harappan.
108. Banti Khera: Cup-on-stand.
109. Bargaon: Base of a pot with incised designs.
110. Bargaon: Copper rings.
111. Bargaon: Animal shaped pot-handles.
112. Bargaon: Terracotta wheels and bead; chert blade and weight, and a bone point.
113. Hulas: Painted pottery, Late Harappan.
114. Hulas: Bangles and beads of faience, stone and terracotta.
115. Hulas: Terracotta cakes.
116. Bara: Indeterminate terracotta object.
117. Ropar: Extended burial, Harappan.
118. Bhagawanpura: Extended burial.
119. Hulas: Paved floor of a house.
120. Hulas: Burnt-brick steps.
121. Hulas: Rammed earth platform.

Article No. 33: Jarrige

122. Mehrgarh: Store rooms of mud and mud-bricks, Pd.III, 4000 B.C.
123. Mehrgarh: Details of plate 128.
124. Mehrgarh: Clay figurines, Pd. IV to Pd. VII.
125. Mehrgarh: Male and female clay figurines, Zhob type.
126. Shortugai: A typical inscribed Harappan seal with rhinoceros.
127. Shortugai: Harappan painted pottery.
128. Shortugai: Harappan red sturdy ware.
129. Shortugai: Mud-brick structures.
130. Shortugai: Sherds of perforated vessels.
131. Shortugai: Pot-sherds bearing Indus characters.

Article No. 35: Gardin

132. The plain of Khwaja Ghar, looking south from the site of Ai Khanum (see fig.5). The standard components of the Bactrian landscape are all present in this picture; a, *lower terrace* with a small branch of the river Kokcha (spreading over a width of about 1 km to the left); b, *upper terrace*, irrigated by canals following the same pattern as in the Hellenistic and Early Islamic periods see fig. 35.5; c. *piedmont zone*, with the Rud-i-Shahrawan flowing at the foot of the hills, and remains of ancient canals on the slopes (not visible here), built in the Graeco-Bactrian period in order to irrigate the upper part of the plain of Archi (which extends to the right of this picture: see fig. 35.6; d. *foothills*, rising southward; e. mountain ranges in the background; the summit of the Ambar Koh (see fig. 35.4), and the Hindu-Kush further away (marked by the horizontal line of clouds).
133. The plain of Dasht-i Qala, looking north from the site of Zulm. This area, now dry, was formerly irrigated by canals drawn from the Kokcha; one of them is clearly visible here, rising several metres above the plain. It was probably dug as early as the Bronze Age (fig. 35.f) and remained in use until the Mongol period (fig. 35.5.).
134. A typical view of the piedmont zone, east of Shortughai (see fig. 35.4). This area was never irrigated; it is occasionally used for dry farming (see pl. 136) or grazing.
135. The foothill zone, east of Shortughai (see fig. 35.4). The slopes, exposed to Westerly winds from the Bactrain plain, are covered with thick layers of loess; they are used occasionally for dry farming.
136. Remains of an ancient ditch spared by the plough, in the irrigated part of the Dasht-i Qala area. The height of the banks is not less than 8 metres above the present fields; this canal was active from the Iron Age, if not earlier, down to the Early Islamic period.
137. A modern canal, north-east of Dash-i Qala, running parallel to an ancient ditch of larger dimensions, the banks of which are visible on the left, several metres higher.
138. Head of a modern canal, north of Yangi Qala, on the Amu Darya, next to an older ditch of Early Islamic times.
139. Terrace on the right bank of the Kokcha, seen from the opposite bank, the Khwaja Ghar area (fig. 35.2). The horizontal line, midway from the top, marks the course of a modern canal drawn from the Kokcha, upstream (on the right); it runs 7-8 km on the steep slope of the terrace before it reaches the top, near Dash-i Qala. In the foreground, head of the left bank canal, which irrigates the plain of Archi several kilometres away (see pl. 140).
140. Terrace on the left bank of the Kokcha, with a modern canal flowing towards the top, in the direction of Archi (see pl. 140). Remains of the ditch which irrigated the plain of Archi in Pre-Mongol times can be seen in the background, on the left side of this canal.
141. A modern canal under construction (1975) on the right bank of the Kokcha, as part of a major irrigation project in the plain of Dasht-i-Qala (pl. 141). This canal was to run close to the hills, on the eastern fringe of the plain, so as to irrigate the whole surface, westward; but the water apparently never reached that area (pl. 142). According to recent reports, a new canal is being planned following a different course.

Article No. 36: Kohl

143. Goch Depe: Terracotta female figurine.
144. Ak Depe: Grey Ware sherds.
145. Ak Depe: Decorated grey ware sherds.
146. Ak Depe: Painted pottery, Namazga III type.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

147. Ak Depe: Painted pottery, Namazga IV type.
148. Ak Depe: Painted pottery, Namazga IV type.

Article No.38: Lamberg-Karlovsky

149. Tepe Yahya: Copper-bronze disc, Pd.IV C.
150. Tepe Yahya: 'Jemdet Nasr' pot A from Room 4 of Proto-Elamite building, Pd.IV C.

Article No.40:

151. Kalibangan: Cylinder seal and its impression.
152. Mohenjo-daro: Seal impression of square stamp seal.
153. Mohenjo-daro: Cylinder seal impression.
154. Mohenjo-daro: Cylinder seal impression.
155. Mohenjo-daro: Drilled and unperforated 'mock' cylinder seals of shell.
156. Harappa: Drilled and unperforated 'mock' cylinder seals of shell.
157. Mohenjo-daro: Twisted 'sealing amulet'.
158. Mohenjo-daro: Twisted 'sealing amulet'.
159. Mohenjo-daro: Two straight-sided 'sealing amulets'.
160. Mohenjo-daro: Three-quarters side view of a terracotta feline head with holes for separate horns, made in a mould.
161. Mohenjo-daro: Open terracotta mould to produce a bull's head (bull's head to the right does not belong to it).
162. Harappa: On the left a terracotta 'sealing amulet' showing a tree standing within a railing.
163. Harappa: On the right terracotta 'sealing amulet' showing 'sacred brazier'.
164. Harappa: Two 'sealing amulets', each showing a single 'unicorn' without the 'sacred brazier'.
165. Harappa: Two short sides of an almost 'book shaped' terracotta 'sealing amulet' showing a horned human figure on the left one.
166. Mohenjo-daro: Rectangular terracotta 'sealing amulet' reverse shows deep impression from a mat.
167. Mohenjo-daro: Side view of three stone heads showing hair-bun (nos. 1 and 3 are casts).
168. Mohenjo-daro: Back view of pl. 167 stone head.
169. Mari: Stone statue of Lamgi-Mari, king of Mari.
170. Mohenjo-daro: Square stamp seal.
171. Mohenjo-daro: Square stamp seal.
172. Mesopotamia: Seal impression of a cylinder seal of the Protoliterate period.
173. Mohenjo-daro: Triangular prism shaped faience 'sealing amulet'.
174. Mohenjo-daro: Triangular prism shaped faience 'sealing amulet'.
175. Mohenjo-daro: Terracotta 'Gate-post' amulet.

Article No.41: Clezion

176. Jebel Hafit: A typical cairn burial.
177. Hili 8: General view of excavations. In the background remains of square building III are encircled by those of the first round building IV. Ruins of later building (I) have been removed.
178. Hili 8: Remains of possible storage system associated with the first period.
179. Hili 8: Coppersmith's working area associated with the late round tower (on the right). End of 3rd millennium B.C.
180. Hili: Plundered grave M (mid- or late 3rd millennium B.C.) Mark a face stone.
181. Hili: Southern door of the round structure with engravings.
182. Hili 8: Remains of outer wall of the early 2nd millennium settlement.

Article No.42: Weiner

183. Yalangach Tepe, Geoksyur: Terracotta female figurine; Pd. Namazga II.
184. Kara Tepe: Terracotta female figurine; Pd. Namazga III.
185. Kara Tepe: Terracotta female figurines. Pd. Namazga III.
186. Gumla: Terracotta female figurine; Pd. Gumla II.
187. Gumla: Terracotta female figurine, Pd. Gumla II.
188. Jawaiwala, Bahawalpur: Terracotta miniature plough.
189. Kara Tepe: Terracotta female figurine, Pd. Namazga III.
190. A modern Turkestan plough.
191. Sarai Dheri, Terracotta female figurine.
192. Namazga Depe: Terracotta female figurine; Pd. Namazga IV.
193. Altin Tepe: Terracotta female figurine. Pd. Namazga V.
194. Kara Tepe: Terracotta figurine of 'priest' (?) Pd. Namazga II.
195. Kara Tepe: Terracotta head of 'warrior' (?) Pd. Namazga III.
196. Harappa: Terracotta seated figure, Pd. Mature Harappan.
197. Kara Tepe: Terracotta female figurine; Pd. Namazga III.
198 Shahdad: Stone lone demon, Pd. Proto-Elamite. Observe holes at the neck as in the dancer'. From Harappa.
199. Shahdad: Another view of pl.198.
200. Geoksyur: Terracotta torso, Pd. Namazga III.
201. Harappa: Red stone male torso, Pd. Mature Harappan.
202A. Harappa: Black stone male 'dancer', Pd. Mature Harappan.
202B. Harappa: Another view of pl. 202 A.
203A. Fars: Stone statuette of a warrior.
203B. Fars: Side view of pl.203 A.
204A. Mohenjo-daro: Steatite male bust of 'priest' (?); Pd. Mature Harappan.
204B. Mohenjo-daro: Side view of pl 204 A.
204C. Mohenjo-daro: Lead of pl.204 A.
205. Mohenjo-daro: Steatite male head, Pd. Mature Harappan.
206. Mohenjo-daro: Other views of pl. 205.
207. Mohenjo-daro: Bronze 'Dancing Girl' (?); Pd. Mature Harappan.
209. Shahdaad: Impression of a cylinder seal.

Article No. 44: Kennedy

210. Mohenjo-daro: Porosity of the right parietal area of Skull No.19.
211. Mohenjo-daro: Reputed 'cut' adjacent to the sagittal suture of Skull No. 10.

Article No. 45: Srivastava

212. Mohenjo-daro: Scene of mythical 'massacre'.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

213. Mohenjo-daro: Another so-called victim of the 'massacre'.

Article No. 49: Yash Pal

214. Synoptic view of the Indus Valley showing the possible course of the Sarasvati beyond Marot through the Nara into the Rann of Kutch. The Rann is conspicuous because of the high reflectance (white tone) of its encrustation.
215. Synoptic view provided by the Landsat of the north western Indian sub-continent showing some of the present rivers and the palaeo-channels. The present sutlej is shown taking a sharp westward turn near Ropar.

The 6-8 km wide palaeo-channel of the Sarasvati can be clearly seen.

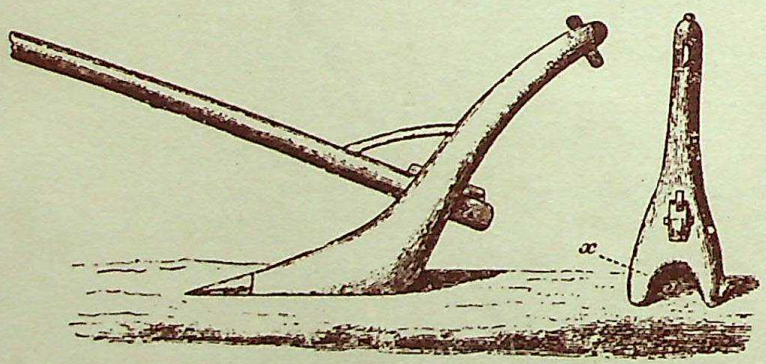
216. Landsat view of the area between the preset Sutlej and the present Ghaggar. The old bed of the Sarasvati and the braided palaeo-channels of the Sutlej are clearly discernible. The frame-covers an area of 185 x 185 km.

Article No. 50:

217. Bahawalpur: Wheel turned Hakra Ware of thin fabric pot with applique clay and sand mixture at the base. Black band on the neck.
218. Bahawalpur: Wheel turned Hakra Ware pot with black slip all over.
219. Bahawalpur: Pot-sherds of hand made Hakra Applique Ware from Hakra culture sites except the one on extreme left in top row.
220. Bahawalpur: Painted Grey Ware sherds and associated 'Black-and-red' and red pottery with impressed designs.

221. Potsherds. **220** and **221** represent respectively terracotta bulls and ploughs of mature Indus period, and Painted Grey Ware and stamped red ware sherds from Cholistan. **222** and **223** have been added by the editors in order to show that the Indian sites on the same Ghaggar river, yield identical pottery. **222** from Binjor and Chak 86 shows stamped red ware sherds while **223** from Binjor shows classical Painted Grey Ware sherds.

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FRONTIERS OF THE INDUS CIVILIZATION

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

FRONTIERS OF THE INDUS CIVILIZATION

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

SIR MORTIMER WHEELER COMMEMORATION VOLUME